An Empirical Analysis of the Christchurch Residential Mortgage Market: Post-Earthquake

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Abstract

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An Empirical Analysis of the Christchurch Residential Mortgage Market: Post-Earthquake

By Rao Yanzhen

The housing and mortgage market in Christchurch experienced significant changes since the 2011 earthquake, especially after the reconstruction of the city. The increasing speed of Christchurch average house price exceed the average house price of the whole country, as well as the number of new dwellings. By this regard, this study surveyed the households in Christchurch to analyze the effect of the earthquake on housing and mortgage market. This includes factors such as housing price, interest rate, government policy and socioeconomic factors in terms of age, gender, educational attainment, income, marital status and family life cycle.

Logistic regression model is used to analyze the data. The study provides an overview of the housing market and mortgage market in Christchurch. The logistic regression, results show changes on sensitivity between the socio-economic factors and house purchase, as well as mortgage borrowing pre- and post-earthquake. The result indicates that the earthquake in Christchurch has affected households' decision on house purchase and mortgage borrowing.

Keywords: earthquake, homeownership, mortgage, Christchurch, socio-economic factors

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Chapter 1

Introduction

1.0 Background

According to Statistics New Zealand (2009), 70% of New Zealanders owned their houses in 2006. To purchase a house, borrowing from financial institutions is the major finance choice for most households since their cash holdings are not sufficient to purchase houses (Campbell, 2006). A mortgage is one of the most commonly used methods to obtain enough capital to purchase a house, thus, the mortgage market adapts to the evolution of the housing demand and prices (Carbo-V. & Rodríguez-F., 2010). Therefore, according to all the literature mentioned before, we can deduce that a high proportion of the country's total population purchasing houses should lead to a high proportion of mortgage borrowing in homeowners.

Before the Christchurch earthquakes in November 2010 and February 2011, some researchers argued that there would be a housing bubble in New Zealand (Fraser et al, 2007). Until the financial crisis in 2008, house price and household debt-to-disposable income ratio in New Zealand dramatically increased approximately 65% and 56% from 2000 to 2007, respectively (Kida, 2009). Fraser et al. (2007) argued that there was a housing bubble in New Zealand because the increase in house prices was generated by price dynamics rather than fundamentals, such as real disposable income. Thus, between 2004 and 2007, the Reserve Bank of New Zealand increased the

Official Cash Rate (OCR) to deal with the inflation associated with the booming of the housing market (Spencer, 2010). With the impact of the 2008 financial crisis, the house price index of New Zealand decreased to the lowest point of about 3000 in 2009 compared to the peak of 3400 in 2007. It recovered slightly in 2010 and this was maintained until the middle of 2012. The housing price index started to climb after 2012 and showed a rapid increase from 2013. Notably, this growth was one year after the earthquake when Christchurch started to rebuild.

According to Parker and Steenkamp (2012), over 150,000 homes sustained some form of damage from the earthquakes (about three-quarters of Christchurch's housing stock) and over 7500 residential buildings have been declared to be in areas that are not fit for living or rebuilding. According to the 2006 and 2013 population censuses, Christchurch had an increase in residents from 424,935 to 436,056. The damaged houses and unfit for living buildings have already caused a decrease in residential houses. As well as the slight increase in population, the requirement for housing is anticipated to rise, which is expected to stimulate the housing market of Christchurch.

1.1 Research Problem

This current study focuses on the post-earthquake residential mortgage market and housing market of Christchurch. The study aims to investigate factors which impact consumers' mortgage purchase behavior and house purchase behavior in Christchurch post-earthquake. Most previous study concerned about the housing and mortgage market after disasters in macro-aspects, such as effect of the government, changes of

average house price, etc.. They discussed the reaction of the government and the macro effect on the whole economy of the disaster area. This study concerns from the households' choice and discusses how the earthquake changes households' attitude on house purchase and mortgage borrowing in terms of the households' socio-economic backgrounds. The result helps to understand the demand of households for houses and mortgage post-earthquake.

1.2 Research Objectives

- ✧ To provide an overview of the housing market pre- and post-earthquake in Christchurch
- ✧ To identify post-earthquake factors based on social-economic factors that affect households' mortgage loans in Christchurch.
- ✧ To determine the socio-economic factors affecting the consumers' housing purchase decisions post-earthquake in Christchurch.

1.3 Research Contribution

There are few studies on the Christchurch residential mortgage market after the 2010-2011 earthquakes. A study which addresses this topic looked at the influence of the financial crisis in 2007 on the Christchurch property market before the earthquakes (Eves, 2008). After the earthquakes, there were some studies concerning the housing market of Christchurch, such as "Housing in Greater Christchurch after the Earthquakes" (Goodyear, 2014) and "The Canterbury rebuild five years on from the Christchurch earthquake" (Wood and Parker, 2016). They focused more on the

recovery of the whole city based on the housing market. This current study focuses on the post-earthquake housing market and residential mortgage market based on the residents' attitudes and their socio-economic backgrounds. The study results offer some evidences to show that the mortgage and house market in Christchurch are affected by the earthquakes.

1.4 Structure of the study

The remainder of the thesis is structured as follows. Chapter 2 reviews the literature on the housing market of New Zealand, the housing market of Christchurch pre- and post-earthquake, factors affecting households' mortgage loans in Christchurch, and socio- economic factors impacting customers' purchasing behavior post-earthquake. Following this, Chapter 3 presents the research method, variables, and research models. Discussion of the results is in Chapter 4 which focuses on the empirical analysis of Christchurch households. Chapter 5 presents a summary of the study, limitations, and direction for future researchs.

Chapter 2

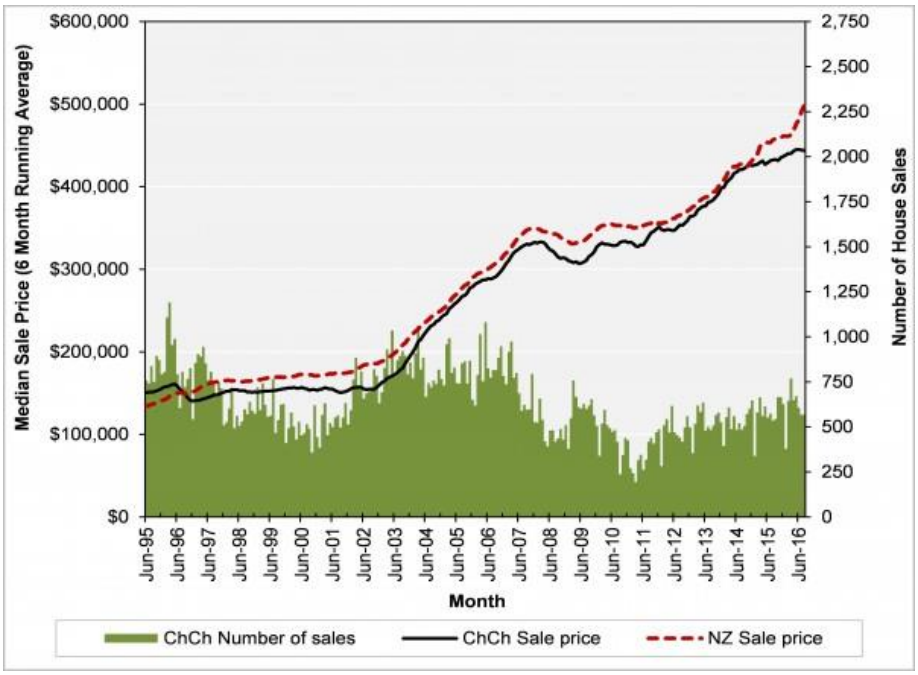
Literature Reviews

2.0 Introduction

This chapter reviews the New Zealand housing and mortgage markets. Section 2.2 analyses the housing prices and the number of new dwellings that shape the development of the New Zealand housing market. It introduces the housing market in Christchurch pre and post-earthquake. Section 2.3 analyses factors affecting mortgage loans in Christchurch post-earthquake and Section 2.4 discusses the factors which impact the mortgage market, including socioeconomic factors.

2.1 An Overview of the New Zealand Housing Market

Figure 2.1 Median House Sale Prices of Christchurch and New Zealand (1995-2016)



Retrieved from: http://www.ccc.govt.nz/culture-and-community/statistics-and-facts/facts-stats-and-figures/housing-and-dwellings/

Figure 2.1 shows the median housing price in New Zealand and the number of houses sold in Christchurch during the past 20 years (in dollar terms). The figure reflects that the house price of New Zealand exhibited a notable downturn (from about $340,000 to nearly $300,000) at the end of 2007 when the global financial crisis took place. Before that year, the data shows a four years' increasing trend. The figure shows NZ house sale prices recovered rapidly between 2009 and 2010, increasing by approximately $30,000. The New Zealand housing market was static before 2012 without any significant increase. Following this, the housing demand exhibited a swift rise until the end of 2015, which was probably driven by rapid growth of the Auckland housing market and the accommodation shortages in post-earthquake Christchurch. The change in house price basically coincides with the comments of Murphy (2011) who said that because of the minor influence of the 2008 global financial crisis on the New Zealand housing market compared with the US and Europe, it is anticipated a new housing boom exists because of the pre-existing institutional practices, market conditions, and government policies in New Zealand. This is related to high levels of home-ownership, policies on the problem of declining house affordability and household wealth formation and pre-crisis.

Figure 2.1 shows the overall trend of the median house price in New Zealand was upward but slowing down (in terms of the speed) until the beginning of 2016. This is consistent with the changes in the growing speed of Auckland's house prices. According to data from the Real Estate Institute of New Zealand (REINZ), until

December 2015, the national median sale price was $465,000, which is more than 3.3% in December 2014 and 1.5% in November of 2015. Although the house price is still increasing, the speed has slowed down. Moreover, the median house price for Canterbury/Westland is $421,150 and $770,000 in Auckland. The median house price for Canterbury is lower than the national house price, while the median house prices in Auckland have exceeded 0.65 times. This change took place at the end of 2009 when house price inflation in Auckland started to skyrocket and showed a remarkable divergence with other regions of NZ (Kendall, 2016). Based on the previous data, the house price in Auckland is correlated with house prices of other regions and always leads the house price trend of these regions. Kendall thinks that the house price of other regions will catch up with Auckland and Auckland house prices will fall to the same level as others to correct the divergence. However, there is no sign that Auckland's house prices will fall to correct the divergence. Further evidence has shown that the national house price increases as Auckland's house price increases, although the national house price increase rate is slower than Auckland's house price increase rate. According to the research of Greenaway and Phillips (2015), Auckland regions has continued to experience a bubble since 2013, and is anticipated that the bubble will continue. Therefore, according to Kendall's study, there is a higher probability for other regions to catch up with the house price of Auckland and the national house price is anticipated to increase in the future.

Figure 2.2 Approved New Dwellings in New Zealand (09/2008~01/2016)

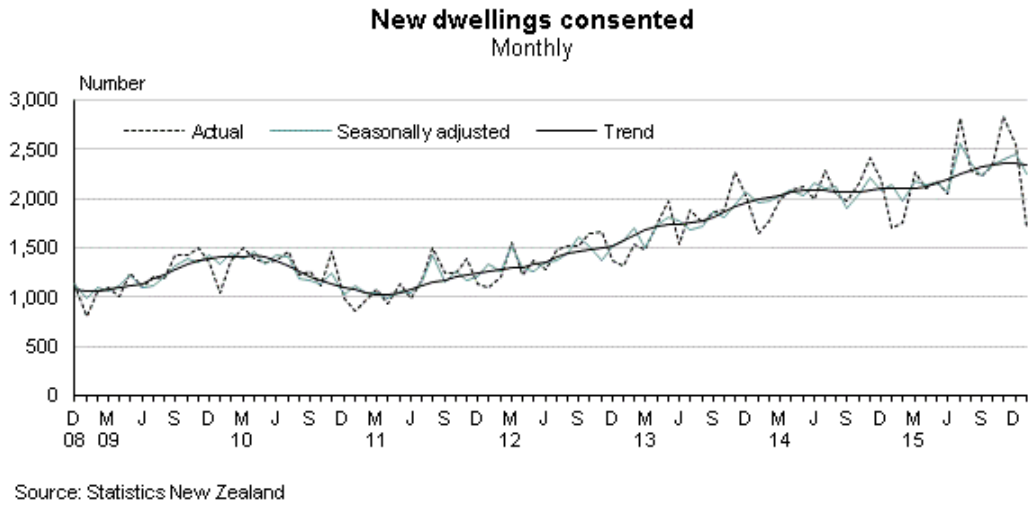


Figure 2.2 shows the approved new dwellings in New Zealand. From Figure 2.2, it may be found that the number of new dwellings increased significantly over the years. From 2003 to 2007, the number of new dwellings did not reflect a significant fluctuation, but from 2007 to 2009, an obvious fall is observed in the figure which took place during the 2007 US subprime loan crisis. Although the new dwellings showed an upward trend in the following year, the 2010 level was still 56% lower than the peak in September 2003 (Statistics New Zealand (SNZ), 2010). It reached the bottom at the beginning of 2011 following the Christchurch earthquake. The trough remained below 1,000 before June 2011 and slowly recovered thereafter. Figure 2.2 also shows that the number of consented new dwellings exhibited a constant rise until August 2014 (SNZ, 2014). In the beginning of 2016, actual new dwellings consented have decreased which is possibly caused by the declining house prices in Auckland.

To identify the development of the New Zealand house market post-earthquake in Christchurch, the aggregate private sector residential dwellings' value shows the gross

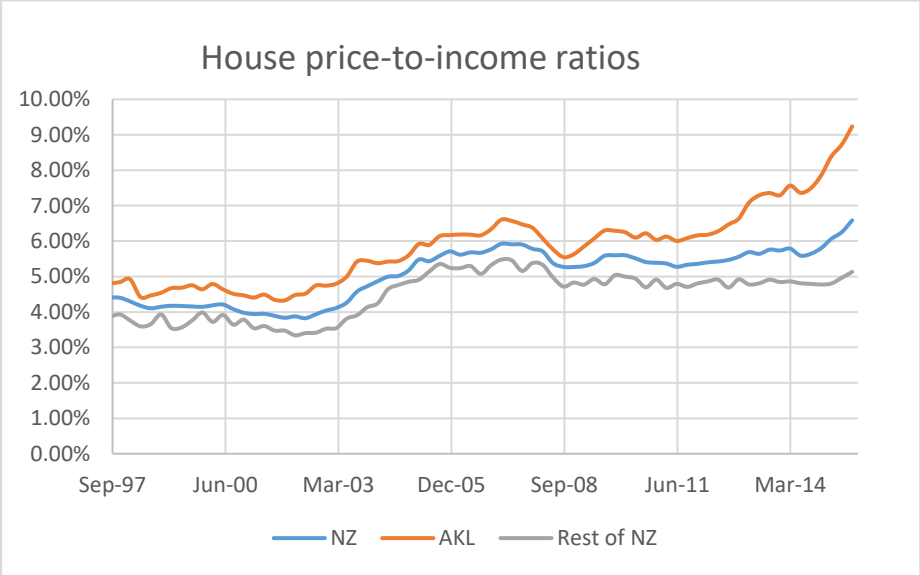
value of the number of residential dwellings multiplied by the housing price. The Reserve Bank of New Zealand (RBNZ) claimed that the value of aggregate residential dwellings reached $862 billion in Q3 of 2015. Based on the data from RBNZ, the growth rate of the gross value of residential dwellings was more than 40% during the past four years and it almost reached the boom period of the housing market before the 2008 global financial crisis.

The aggregate private sector residential dwellings value shows the entire housing market in New Zealand exhibited a rapid increase post-earthquake in Christchurch. At the same time, the RBNZ lowered interest rates. According to the RBNZ report, the current official cash rate is 1.75%, which is less than 8.25% in early 2008 and before. The interest rate is one of the most commonly used monetary policies to control the economy. However, contrary to the usual RBNZ's inflationary policy, the RBNZ insistently held interest rates to a low level to drive up the downside of the economy, as well as to stimulate the recovery of the housing market after 2008.

The accelerated increase in the current housing market worries New Zealanders, especially house prices in Auckland. Finance Minister Bill English (2015) said the median house price in Auckland was nine times more than people's average income, and the 20% to 25% rise per year in Auckland house prices was a risk to the NZ economy. Based on the Statistics of NZ data, the increases in the rates of New Zealanders' median incomes from 2012 to 2015 were 2.5%, 3.5%, 1.6% and 4.1%., respectively These rates are strictly lower than the growth rate of Auckland house

prices.

Figure 2.3 House Price-to-Income Ratios (9/1997 to 9/2015)



Source: Reserve Bank of New Zealand

Figure 2.3 shows house price-to-income ratios of overall New Zealand, Auckland and the rest of New Zealand (except Auckland). House price-to-income ratio measures the ratio of the median house price per unit to median household income. It reflects the affordability of houses and the capacity of customers to purchase houses (Malpezzi, 1998; Mcdonald, 2015)[1]. Housing affordability is a tenure-neutral term that denotes the relationship between household expenditure and household income on housing costs (Yates et al, 2007). Usually, a high house price-to-income ratio reduces the possibility of households obtaining their houses without financing a debt. On the other

[1] Another affordability rule is also mentioned by commentators, which is named as the 30/40 affordability rule. That is "housing costs based on mortgage or rental payments should not exceed 30% of the household income or more of their gross household income distribution (40%)". This is the most widely used criteria for affordability of households (Sliogeris, et al, 2008). As a benchmark, the 30/40 affordability rule causes low income household to fall into the condition of housing stress.

hand, it enables households who are willing to purchase a house to get into the mortgage market.

Figure 2.3 also shows the price-to-income ratio of overall New Zealand exhibits quite a smooth trend from 2008 to middle of 2014. Figure 2.1 indicates a rise in the house price in the whole country from 2008 to the middle of 2014; meanwhile, the line graph in Figure 2.3 of the NZ price-to-income expresses a steady increase in household income consistent with house price. But after that, it starts to climb. With regard to Auckland and rest of New Zealand (minus Auckland), the ascent of the New Zealand house price-to-income ratio is generated by the enormous growth of Auckland's house prices. From 2008 to the middle of 2014, the New Zealand government has boosted the minimum wage every year, about 50 cents per year[2], with a steady increase in household income. This means with a steady increase in households' income the attractive growth of the New Zealand ratio is attributed to the house price.

Mr. English said the New Zealand government prefers to provide more houses for residents rather than increasing interest rates which may generate huge political pressure to provide assistance to middle-income households. According to the supply and demand theory, the price of goods is influenced by supply and demand. If demand stays the same when supply grows the price will fall (Smith, 1776; Ricardo, 1817, Jain, 2006). According to Ingerson (2016), house prices in Auckland experienced a

[2] Source: Employment New Zealand. Retrieved from: http://employment.govt.nz/er/pay/minimumwage/previousminimum.asp

decrease at the end of January 2016 while house prices increased in the other cities of New Zealand. However, Igerson (2016) also reports that after the drop of several months, the house price in Auckland started to increase and has rebounded after March 2016.

As shown in Figure 2.3, in spite of the high price-income ratio in the Auckland housing market, the ratio for the rest of New Zealand is quite robust. The figure indicates that it is more tolerable for house prices in other regions to have a rise if the national household's income keeps increasing. According to RBNZ data[3], the number of new migrants to New Zealand has increased steadily, while departures show a slight drop in recent years. According to the previous researches of Coleman and Landon (2007) and McDonald (2013) on the relationship between migrants and the housing market in New Zealand, the inflow of migration accelerated the demand for houses and improved expectations on the future house market for agencies. Obviously, the growing net immigration will have an impact on house prices (Coleman and Landon, 2007; McDonald, 2013). Therefore, it could be anticipated that house prices in New Zealand will probably exhibit a continuously increasing trend.

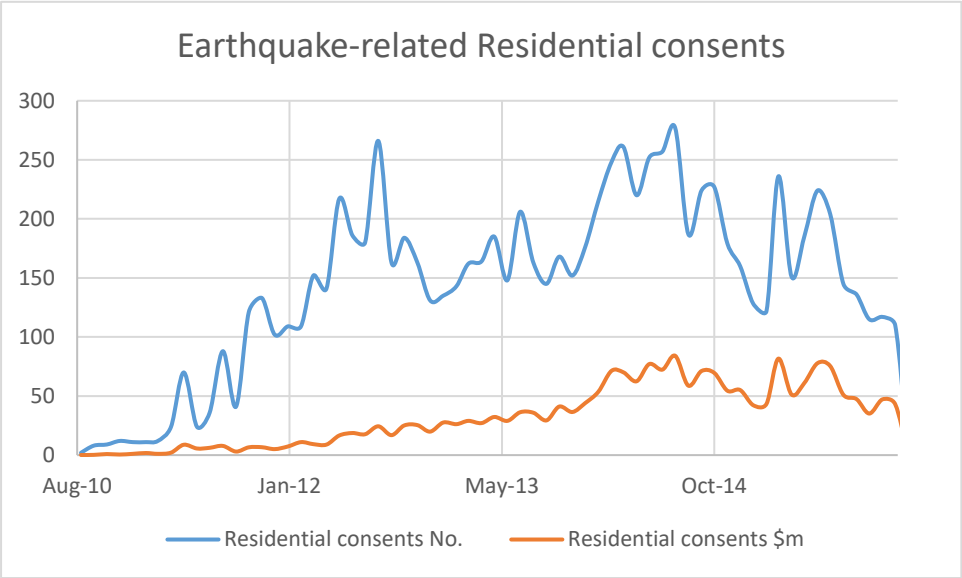
2.2 An overview on the housing market in Christchurch

The two earthquakes in 2010 and 2011 made huge changes in houses in Christchurch. Buildings were damaged and destroyed by the earthquakes and new houses are on the schedule to be built.

[3] Source: Reserve Bank of New Zealand. Retrieved from: http://www.rbnz.govt.nz/statistics/m12

According to the data of SNZ, following the two earthquakes (September in 2010 and February in 2011), there was a decrease in building consents in Canterbury (SNZ, 2012). Monthly new building consents reached the lowest point of about $70 million in January 2011 and started to grow after May in 2011. They reached the peak in September 2014 and exhibited a decreasing trend in the following year (SNZ, 2016). In January 2016, monthly new building consents fell to the lowest number in five years.

Figure 2.4 Earthquake-related Residential consents (9/2010~1/2016)



Source: Statistics New Zealand

Figure 2.4 shows earthquake-related building consents in Canterbury. Even though some consents were approved before the second earthquake, the considerable amount of approvals began in May 2011 and sustained a rapid growth. The total number of building consents was 673 in 2011, the most in the latter half of the year, with a sum

equivalent to $55.9 million. They skyrocketed to 2,001 ($201.2 million) in 2012 and sustained a similar number in 2013. During 2014, the total building consents were 2,707 with an average of 226 per month, and were approaching $800.3 million[4]. It could be observed they reached their peak and remained relatively stable during that period. Compared with 2011, they increased more than three times during the last three years. After the reconstruction in 2014, the increase has slowed down and the total building consents declined to 1873 ($656.8 million). Therefore, based on Figure 2.4, ignoring non-earthquake related residential consents, the rate of growth of new building consents has been the same in Canterbury as the country's overall total new building consents. However, Figure 2.4 shows that there are still a large number of new dwellings being built. They are not accounted as earthquake-related if they are not rebuilt in the same original site as when SNZ collected data[5].

In two of the New Zealand Censuses of Population and Dwellings in Canterbury in 2006 and 2013, there were 201,660 occupied private dwellings, 18,117 unoccupied dwellings and 1,794 under construction in 2006[6]. In 2013, it had 206,916 occupied

[4] Source: Statistic New Zealand. Retrieved from: http://www.stats.govt.nz/browse_for_stats/industry_sectors/Construction/canterbury-earthquake-building-consents.aspx

[5] Noted in http://www.stats.govt.nz/browse_for_stats/industry_sectors/Construction/canterbury-earthquake-building-consents.aspx

[6] Source: Statistics New Zealand. Retrieved from: http://www.stats.govt.nz/Census/2006CensusHomePage/QuickStats/AboutAPlace/SnapShot.aspx?id=1000013&type=region&ParentID=

private dwellings with 28,320 unoccupied dwellings and 1,917 under construction[7]. There were 15,582 dwellings between the two censuses, about 7% growth. In terms of New Zealand as a whole, the number of dwellings increased to 6.2%[8], while the overall rate increase of new dwellings consents in Canterbury are thought to have exceeded the whole country, although many destroyed dwellings in Canterbury were rebuilt. This means the actual new building dwellings in Canterbury should exceed the recorded numbers because of the reconstruction. Therefore, the continuous reconstruction of Christchurch after the earthquake has had a significant impact on the increase in the housing market relative to the whole country. In fact, the second earthquake in February 2011 destroyed many houses in Christchurch. According to Prime Minister John Key's speech on March 7, 2011, immediately after the earthquake, there were 10,000 houses and several hundred commercial buildings in Christchurch to be demolished and another 10,000 houses suffered all kinds of damage. Based on the report of the Christchurch City Council (CCC), it was estimated that about 91% of properties were damaged in the 6.3 magnitude earthquake and required major repairs. Moreover, to distinguish the seriously damaged zone from the other zones, the New Zealand government established a red zone in severe earthquake-damaged areas that were unsuitable to live in and costly to repair (Canterbury Earthquake Recovery Authority, CERA). Inside the red zones,

[7] Source: Statistics New Zealand. Retrieved from: http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx?request_value=14703&tabname=

[8] Source: Statistics New Zealand. Retrieved from: http://www.stats.govt.nz/Census/2013-census/data-tables/population-dwelling-tables.aspx

there were approximately 7,600 properties that were demolished. There are still about 4,700 properties (exclusive of the red zone) to be demolished. In total, according to CERA's estimation, there are about 16,000 properties severely damaged and more than 9,000 becoming uninhabitable (Goodyear, 2014). Moreover, more dwellings required major repairs. Eventually, the two earthquakes that took place in Christchurch destroyed many residential houses. From the evidence above, there was a large number of houses which were no longer suitable to live in. For many homeowners in Christchurch, they are still waiting for reparation of their houses and is anticipated to continue for several years (Toomey, 2015). Even some zones of the city have been identified as being uninhabitable. This has resulted in a serious decrease in the number of residential houses. If the population in the city does not have a notable reduction, it is anticipated that there will be an increasing demand for residential houses from people who have lost their houses as well as from some new migrants from other regions.

Therefore, changes in the population of Christchurch are important in analyzing the housing market. Based on the data from Statistics New Zealand, the population of Christchurch exhibited a slight increase in Greater Christchurch. According to the two censuses of Greater Christchurch in 2006 and 2013, the Christchurch population has increased from 424,935 to 436,056. The increase is slower than the national population growth (5.3%) (SNZ, 2013), but is still a remarkable number for Christchurch after the earthquake, in a short time.

The damaged houses are not suitable for people to live in while people who need houses keep increasing. Both the increasing demand for houses and an insufficient supply of houses drove housing prices up. Therefore, if there is more inflow of migrants, housing prices in Christchurch will exhibit an upward momentum.

To analyze the changes in housing prices in Christchurch, the median housing price and the number of sales in Christchurch from 1995 to 2016 are documented in Figure 2.1. In Figure 2.1, the median house price in Christchurch was about $150,000 before 2002. Following this, house prices started to grow rapidly with an increase in the number of house sales. The figure also shows Christchurch house prices exhibited a downturn trend during the period of 2008~2009, which took place at the outbreak of the 2008 global financial crisis. Following this downturn, house prices started to rise, and house sales followed the same change after a short-term lag in several months. The lowest point for house sales was before June 2011, after the second earthquake (see Figure 2.1). Even though no evidence has shown that the change in house sales had any effect on house prices, the house price still exhibits a negligible fall followed by a growth. Similarly, the number of houses sold also increased and maintained 500 sales every 6 months (see Figure 2.1). During the last three years, the six-monthly sales of houses have been stable, whereas house prices increased from $330,000 to about $430,000. The growth rate has exceeded 30%. The changes in the Christchurch housing price are consistent with the housing prices of the whole country, but at a lower speed than the whole country in 2014. From Figure 2.1, it is evident that the

speed of housing growth has slowed down in Christchurch, whereas there is a jump in national house prices.

Another observed situation of the housing market is the growing number of unoccupied dwellings. The number of unoccupied dwellings in 2013 was about 10,000 and almost doubled that in the census in 2006. Nevertheless, the number of occupied non-private dwellings (residential care for elderly people, educational institutions, residential and community care facilities, or hotel, motel or guest accommodation) increased from 540 to 582 between 2006 and 2013, while there was a drop in occupied private dwellings (Christchurch City Council).

Snowdon (2011) estimated that it would take at least 10 years to reconstruct the whole city of Christchurch. From the report of CERA, the government has already invested heavily to rebuild Christchurch and both economic activities and the employment rate have risen to 4.7% and 3.2%, respectively (CERA, 2014).

2.3 Factors affecting households' mortgage loans in Christchurch

This current study examines the attitude of customers purchasing a house and mortgage post-earthquake. The study investigates how the earthquake has influenced households' decisions to purchase a house in Christchurch which in turn affects households' home loan choices.

2.3.1 Factors related to the earthquakes

With a comparatively higher price than most other assets, houses are valuable assets

for households; the house price usually occupies 40% of the household wealth (Benito et al, 2006). However, a house has other features to make it different from other assets, such as equity and durable consumption and providing shelter and other services. Such kinds of features make real estate unique and require careful consideration of the households (Goodhart and Hofmann, 2007; Hilbers et al, 2008). For a buyer, the first thing he/she needs to think about is his/her income and budget, and financing ability determines what kind of house he or she can select (Socrates Media, 2006). The financing ability is correlated with the price of the house, income, and savings of the household, the possible mortgage and the ability to pay for the house (Socrates Media, 2006). Indeed, housing price is one of the most direct factors that impact affordability for house buyers. Furthermore, in the research of Ranney (1981), the exogenous factors impacting housing price are current housing prices, the current mortgage market, housing supply, released policy related to the mortgage market, household income and preferences on financial constraints.

Moreover, a higher housing price implies higher collateral values which will enable households to access the mortgage market (Catte et al, 2004). In addition, the anticipated increase in housing prices will stimulate the demand for houses and increase mortgage borrowing (Mankiw and Weil, 1989). When future house prices are expected to increase, house buyers will be influenced by two factors: higher prices in the future and increasing demand. Shi et al's (2013) study reveal the New Zealand mortgage market rate also impacts the housing price, especially the fixed mortgage

rate. Changes in interest rates will change the house payment. Compared with floating rates, the reaction to a fixed mortgage is not as sensitive to changes in interest rates. Thus, the prediction of future housing prices is based on fixed mortgage rates rather than floating rates. In Shi et al's study, the relationship between housing price and fixed mortgage rate is positive holding other variables constant.

In early research, researchers found that houses located in highly hazardous areas and areas damaged heavily by earthquakes are not so attractive for consumers, they prefer to pay less in these areas (Brookshire, et al, 1985). The post Loma Prieta earthquake situation in California indicated that the earthquake made consumers become more concerned about earthquake risk and overestimated the earthquake hazard (Beron et al, 1997). Evidence shows that there was a reduction in property values in earthquake ridden areas and house values outside an earthquake area were higher than inside the area on average (Murdoch et al, 1993). However, property values are heavily affected by public information about earthquake risk (Önder, et al, 2004), especially for earthquake-prone areas. In terms of the massive earthquake in Japan, the price of property after the earthquake was significantly lower than pre-earthquake. The government is required to assess the risks of earthquakes in quake-prone areas because of the underestimated assessment of the earthquake risk for individuals, which makes it possible for households to adopt adequate anti-quake measures and take out relevant insurance (Naoi, et al, 2009). Therefore, house price represents a complex relationship between mortgage borrowing and earthquake.

Another factor which significantly impacts on the housing market relating to earthquakes is government policy. Generally, through various policies, the government plays an important role in the house and mortgage markets. Usually, two kinds of policies affect the mortgage market: monetary policy and non-monetary policy. For the government, using monetary policy in the mortgage market is aimed to speed up the response to inflation and moderate the boom-bust cycle of the housing market (Taylor, 2007). In this current study, we are concerned with non-monetary policy in Christchurch post-earthquake.

Non-monetary policy aimed at the disaster is more effective and specified for individuals (Kunreuther, 2006). The Government plays a direct role in emergency rescue after an earthquake and provides the most prevailing rebuilding measures thereafter (Horwich, 2000). Evidence in Kobe after the Hanshin great earthquake indicates an active housing policy facilitates socio-economic development (Hirayama, 2000). In the report of Barenstein (2006), the government supports played a positive role in the construction of Gujarat post-earthquake, where houses were massively rebuilt and most households reported that their housing situation had improved. The recovery after the Wenchuan earthquake in China is attributed to the leading role of central government which controlled large amounts of financial resources, set rules and regulations followed by local government, and weak participation of non-governmental organizations in the rebuilding process (Huang, et al, 2011).

The post-earthquake policy will influence the recovery of the economy and disaster

hazard of individuals, for example, the "$3K to Christchurch" policy (Work and Income, 2014) in which new migrants will get $3,000 if they work in Christchurch for more than three months. The policy encourages workers to move to Christchurch (now merged with $3K to Work). The growth in the population accelerates the demand for houses and mortgages (Work and Income, 2014). The policy devoted more resources to reconstruct the city to accelerate the recovery, as well as enhancing households' confidence to live in Christchurch.

The New Zealand government established a department called Canterbury Earthquake Recovery Authority (CERA) on March 29th, 2011, to lead and coordinate the ongoing recovery effort following the two earthquakes in September 2010 and February 2011 (Donnell, 2011). The latest recovery strategy for the Greater Christchurch Report of CERA reveals that the reconstruction is still continuing (CERA, 2015). Especially, the report says that housing pressure still remains a key stressor from living in damaged houses or temporary accommodation.

Moreover, the department is responsible for the land zone and technical categories which enable house buyers to choose their houses, such as red zones being abandoned, and green zones classified into TC1, TC2, TC3 or TC N/A (CERA, 2011). These technical categories describe the performance of land in future earthquakes. TC1 zone is classified as grey land, which is unlikely to incur damage from liquefaction and allows standard foundations for concrete slabs and timber floors. The yellow TC2 zone may have minor to moderate damage from liquefaction in future earthquakes.

The TC3 zone is blue and may suffer moderate to significant land damage from liquefaction in future earthquakes. These zones impact household choice about house location.

2.3.2 General Factors Affecting Mortgage Borrowing

Besides factors related to earthquakes affecting mortgage borrowing, there are some other factors, which are non-earthquake related, impacting households' choice on mortgage borrowing.

It is hypothesized that interest rate is one of the most important factors that influences the cost of a mortgage, and affect borrowers' borrowing behavior. One of the determinants of mortgage rates is the benchmark interest rate controlled by the Reserve Bank, such as the Reserve Bank of New Zealand's Official Cash Rate in New Zealand. The mortgage market is quite sensitive to the volatility of the interest rate which can negatively impact the value of a mortgage and repayment (Quigley, 1987). If a sudden increase in interest rate takes place, there will be a large loss of mortgage market value in a fixed-mortgage contract and homeowners are less likely to repay their loans (Green and Shoven, 1983). The nominal interest rate affects consumers' decisions to choose between a fixed-rate mortgage and a floating-rate mortgage. In fact, unanticipated changes in real interest rate will have a small effect on house prices but a larger effect on housing consumption. Furthermore, the unanticipated reduction in the real interest rate also shocks house prices because of lowering the rate of future housing service (Aoki et al, 2004). Therefore, the interest rate is hypothesized to have

a negative impact on the mortgage borrowing of borrowers.

Household income is also one of the important socio-economic factors affecting mortgage borrowing. The income of households determines the ability to afford the down payment for a house (Ortalo-Magne and Rady, 2006) and repay mortgage interest and principal. Therefore, it affects the ability of households to repay mortgages. In most models of mortgage choice, household income is one of the factors analyzed critically, income growth will encourage households to borrow a housing loan (Chambers, et al, 2009). There will be a variation in mortgage rates as the household income changes (Archer et al, 1996). As a borrowing constraint, it has an adverse impact on home-ownership propensities, especially for low household incomes (Linneman and Wachter, 1989). Therefore, a higher household income is hypothesized to have a positive impact on the probability of a borrower borrowing a mortgage.

Educational attainment is also regarded as a factor affecting mortgage decisions. A higher educational background implies the borrower is expected to have a higher income, lower LVR (Loan to Value Ratio) or higher credit histories, all of which make it easier for them to obtain housing loans (Munnell, et al, 1996).

Occupation is the third factor related to mortgage borrowing. It is also thought to influence house prices with some economic factors, such as population shifts and income trends (Reichert, 1990). According to Reichert's (1990) study, the increase in the employment rate has a slightly positive effect on house prices. Employment has a

close relationship with income and both variables measure the tolerance of households to pay for their house and mortgage loan. Chien and DeVaney (2001) suggest that income is positively related to households with a professional or managerial occupation. Therefore, a higher-income employment pattern is hypothesized to positively affect borrowers' ability to borrow a mortgage.

It is contended that family composition has an important impact on house purchase. Research has found that the married households have a higher probability of getting a mortgage from financial companies (Black et al, 1978). As well, Robinson's (2002) study shows a single household impacting the decision to borrow to buy a house differently. In the research of Hartarska and Gonzalez-Vega (2006), they found that married households were counseled borrowers and were more suitable to get a mortgage. Robinson declared that single women who raise children at home are expected to have difficulty in borrowing home loans. Therefore, married households have a higher probability of borrowing a mortgage. Pryce and Keoghan (2002) found that households with a greater number of children have a lower default risk. In their research, they found that households with a large number of children have lower rates of mortgage payment insurance take-up because they do not require the protection of a stable employment. However, the study of Hartarska and Gonzalez-Vega (2006) indicate that households are associated with higher default risk. Thus, as the number of household children increases, the probability of borrowing a mortgage will increase.

As well, the size of the household is one of the factors affecting mortgage purchase. The research of Gerardi, et al (2010) found that the relationship between income and size of household is positive. As well as household income also presenting a positive effect on mortgage borrowing, the higher income will enhance the probability of getting a mortgage for a household. From the study of Elliehausen and Staten (2004), the result of their regression indicates a positive relationship between the size of household and mortgage borrowing. The large size of a household will stimulate the requirement of a mortgage. Therefore, the probability of borrowing a mortgage will increase as the family size increases.

Gender also influences mortgage borrowing. In the research of Ojo and Ighalo (2008), their result showed there are more males taking housing loans than females as heads of families. (Ojo and Ighalo, 2008). According to Robinson (2002), the US mortgage market is more difficult for females to access than males. It reflects that gender constraints financial agencies from providing home loans for households. Thus, males are more likely to borrow mortgages than females.

It is contended that the age of the borrower impacts mortgage borrowing. Schors et al. (2006) believe that there is a negative relationship between age and mortgage loan and homeownership. Agarwal et al. (2007) revealed there is a U-shape relationship with mortgage and people's age. People are willing to borrow mortgage loans from twenty years of age and above, and it then reached the peak around sixty years and decreased thereafter. Therefore, the probability of a household borrowing a mortgage

is hypothesized to increase as the age of the head of the household increases and then decreases after sixty years.

2.3.3 Determinants of Homeownership

In the model of Kain and Quigley (1972), they considered some socioeconomic variables on the tenure status of houses, such as family size, family composition, employment status, household income, and race. They found that income and education have a positive effect on homeownership. On the other hand, family size has a negative impact on homeownership with regard to household propensities (Kain and Quigley, 1972). Older households are more willing to purchase a house than younger households. The probability of female-headed families being homeowners is less than for a male-headed family (Kain and Quigley, 1972). These demographic factors of the households both impact the demand for houses and the mortgage market.

Income is typically regarded as a major factor in housing decisions. (Winger, 1968; Goodman, 1988). Income measures the willingness of the households to purchase houses. Household income is assumed to be positively related to the probability of home-ownership (Bourassa, 1995) and evidence shows that a lower home-ownership rate is related to lower household income (Painter et al, 2001). Thus, a higher household income will result in a higher probability to purchase a house.

Gender is also an important factor for home-ownership. In the research of Manrique

and Ojah (2003), they found that a male household head has a higher probability of owning a house than a female. Other researchs also show that there are fewer female-headed families owning houses than males (Allen, 2002; Brisson and Usher, 2007). However, the research about New Zealand is contrary to the studies of other countries. Law and Meehan's (2013) study showed that females have a higher likelihood of owning a house than males. One of the possible reasons for this trend is the different under-employment rate for females and males in New Zealand. Starting in 2004, the HLFS under-employment series of New Zealand showed that women have had both a higher rate and level of under-employment than men. A higher under-employment rate and level of under-employment usually indicate a higher capacity to afford a house. This is documented in the empirical result of Law and Meehan's (2013) study. Therefore, females have a higher probability of owning a house than males in New Zealand.

In housing tenure choice, households in younger age groups with lower wealth have a lower percentage of owning a house (Painter et al, 2001). Feijten et al (2003) found that households in the age groups of 25 to 29 years and 30 to 34 years have the highest probability of being first-time homeowners. Household income usually increases with the age of the head of the household (Manrique and Ojah, 2003). In addition, older households are more likely to accumulate more household wealth. Thus, housing demand from households tends to rise with the increase in the age of the household (Green and Hendershott, 1996). This implies that older households are

more likely to own a house than younger households.

Marital status impacts households' decision to be homeowners. According to the logit regression model of Feijten et al (2003), householders who are married or are cohabitants prefer to buy houses at a younger age than singles. Hood (1999) gave reasons for marital status affecting home-ownership: 1) Married people are less mobile than unmarried individuals, this saves their transaction costs and enhances the preference to be a homeowner in a permanent place; 2) Married couples could pool their income and wealth and the greater household wealth enables them to more easily purchase a house than unmarried individuals; 3) With a future forecast to raise children, to own a house as a stable environment and long-term investment is attractive for married households. Moreover, Allen et al (2004), Helderman and Mulder (2007) and Minas et al. (2013) conclude that many parents help their adult children to become homeowners as a wedding gift. Support from parents gives married households more wealth to afford a house than unmarried individuals. Therefore, married people are more likely to own a house.

The number of children or dependents is correlated to the size of the household. Mulder and Billari (2010) suggest that home-ownership restricts the fertility of households and a better living environment encourages households with children (or planning to have a child) to own a house. Hood (1999) believes that a one-child family has a positive impact on home-ownership. There is a 20% increase in the probability of owning a house for households with children than one without children.

However, the relationship becomes complicated as the number of children increases. The growing family members require a stable living place and more room for raising children. At the same time, large household size also constrains households' ability to afford a house because of the increase in the daily expenditure of the family. Segal and Sullivan's (1998) data shows households with two children have the highest home-ownership possibility and this rate decreases as the number of children increases. Therefore, there is a positive relationship between the number of children and home-ownership decisions if children are fewer than three, and the relationship turns into negative if the number is more than three children.

Employment and occupation of household heads are another factors affecting home-ownership. Generally, employment patterns generate different demands and needs for households to consume and pay for their houses (Clapham, 2005). Employment is the major source of income for households (Clapham, 2005). Courgeau and Lelièvre's (1992) study shows the lowest correlation (0.187) between home-ownership and occupation is the husband who is an unskilled worker, while the correlation is 0.416 for a husband with a crafts-tradesman job. The result reflects that households with professional occupations have a higher probability of home-ownership. Therefore, employment and better occupation have a positive effect on the home-ownership of households.

The level of education is also a factor affecting home-ownership decisions. Gyourko and Linneman (1997), Painter et al, (2001), and Andrews and Sánchez (2011)

revealed that the educational attainment of the household head indicates the prospect of family wealth related to household income and future potential earnings. Their data show that poorly educated households have a relatively lower probability as homeowners than well-educated households (Gyourko and Linneman, 1997). In Gyourko and Linneman's study, the ownership propensities in non-high school graduates from 18 to 25 years varied between 34% and 36%, while college graduates reached 58% in the same age group. Thus, households with higher education are more likely to own a house.

The size of the house is also treated as one of the factors affecting the housing choice (Campbell and Cocco, 2007). As the usual consideration, the number of rooms is one of the key elements of dwelling construction (Dieleman, 2001). The size of the house is relevant to the household wealth which impacts the households' affordability, as well as household income (Gerardi et al, 2010).

The size of the household is one of the important factors in households' decisions in house buying. The relationship between the size of household and home-ownership is always believed to be positive (Fisher and Jaffe, 2003). However, in the research of Andrews and Sánchez's (2011), the results for Germany, Italy and Australia imply a downward influence on home-ownership, while there is an upward effect on the aggregate home-ownership rate in the countries of Austria, Canada and Denmark. The research of Quercia, et al (2003) also indicated a negative coefficient between the size of household and home-ownership. According to the findings of Gerardi et al, (2010),

there should be an approximately 1.6% higher future income with each one-person increase in the size of a household. This requires the households to contain adults who have the ability to create household wealth. The either positive or negative result is possibly dependent on the proportion of dependents in a family. Therefore the size of the household has a significant impact on house buying.

2.4 Summary

Chapter two provides an introduction to the mortgage market and housing market of New Zealand and Christchurch. The chapter also discusses the factors affecting the housing market and mortgage market, such as interest rate, government policy, household income, age, gender, education, marital status, size of household, etc. The chapter further discusses the changes in residential housing.

The next chapter presents the theoretical and empirical methodologies, sampling and data collection method.

Chapter 3

Data and Research Methodology

3.0 Introduction

Chapter Three discusses the data and research methodology. The empirical framework of the research is based on the qualitative choice model. Based on the binary choice of the dependent variable, logistic regression is used to answer the research objectives. Descriptive statistics describe the rate of home-ownership, the rate of mortgage purchase, as well as the mortgage and housing market between pre-earthquake and post-earthquake from the survey questionnaires. The chapter also discusses the research design and survey questionnaire development and format. The chapter concludes with the method, sample size, and sampling technique.

3.1 Empirical Framework

The individual's choice of many commodities and services has a discrete nature, and it is beyond the capability of traditional demand theory to analyze such a choice (Ben-Akiva and Lerman, 1985; Trajtenberg, 1989, 1990; Kim, Widdows and Yilmazer, 2005). Therefore, new models for discrete choice are established to solve this problem. A qualitative choice model is used to determine the discrete choice, for instance, whether to reject an individual housing loan or not. A standard binary logit model represents the decision to own a house or not, assuming that the random term (dependent variable) is logistically distributed. On the other hand, a binary probit model assumes that the random term falls into a normal distribution (Maddala, 1993;

Greene, 2000). For simplicity, our study is based on the logit model. The model is estimated by the maximum likelihood method via SPSS software. The choice of probabilities could be expressed as (Train, 1986):

$$P_{in} = \frac{e^{Vin}}{\sum_{j \in J_n} e^{Vjn}} \text{ , for all i in } j_n \quad (3.1)$$

where P_{in} is the probability of making the choice by individual i.

$$P_{in} = \text{Prob}\ (V_{in} + \varepsilon_{in} > V_{jn} + \varepsilon_{jn} \forall \text{ j, and i} \neq \text{j}) \quad (3.2)$$

,where V_{in} is the observed variable. In this study, V_{in} represents the homeowners/mortgage buyers' characteristics, as well as n indexs the number of buyers; and ε_{in} is the utility of unknown or excluded aspects by researchers.

Equation (3.1) can be rewritten as:

$$P_{in} = \frac{1}{1+e^{-u(V_{in}-V_{jn})}} \text{ where i} \neq \text{j, } u \text{ =scale parameter and } u > 0, \quad (3.3)$$

The logit model will be used to achieve the second and third research objectives.

Research objective one presents an overview of the housing market in Christchurch. In this objective, descriptive statistics of the surveyed respondents are used to discuss the housing market in Christchurch pre- and post-earthquake.

Based on the survey, descriptive statistics of the sample respondents provide information about the pre- and the post-earthquake housing market in Christchurch. The descriptive statistics include the proportion of home-owners during pre-earthquake and post-earthquake periods, the proportion of home-owners who lost

their houses due to the earthquake, and the proportion of homeowners who bought a house post-earthquake. Further, the percentage of houses which are impacted by the earthquake is important. The survey result compares the rate of not seriously damaged houses, houses requiring repair and totally destroyed houses. The results also compare the percentage of home buyers whose houses are new dwellings post-earthquake and the first owner of the house pre-earthquake.

Research objective one provides an overview on the housing market pre- and post-earthquake in Christchurch.

Research objective two investigates the socio-economic factors that affect a household's desire to a use mortgage loan to buy a house post-earthquake. Thus, the consumers exhibit a simple binary choice: to borrow or not to borrow to buy a house. U_{1n} could be used to represent the customer's utility of borrowing a mortgage loan, while U_{0n} stands for the customer's utility of not borrowing a mortgage loan. The function could be written as:

$$U_{in}=V_{in}+\varepsilon_{in},\ i=\{0,\ 1\} \tag{3.4}$$

The customers will choose to borrow to buy a house when $U_{1n}>U_{0n}$, V_{in} is the individual choice. ε_{in} includes all the unobservable and distributed residuals. The possibility of borrowing choice should be $P_{1n}=Pr_n\ (U_{1n}\ >U_{0n})\ =\frac{1}{1+e^{-u(V_{1n}-V_{0n})}}$. Therefore, the logit model can be written as:

$$Y_{in}=ln\left(\frac{P_{in}}{1+P_{in}}\right)=f(x_1,\dots,x_n)+\varepsilon_{in} \tag{3.5}$$

The parametric functional form of the logit model can be written as follows:

$$Y_{in} = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8,) + \varepsilon_{in} \quad (3.6)$$

Where, Y_{in} = Decision to borrow a loan (where 0 = do not borrow; 1= borrow)

x_1 = Household income (+)

x_2 = Educational attainment (+)

x_3 = Occupation (+)

x_4 = Marital status (where 1=single; 2=married; 3=others (divorced, widowed and de facto relationship) (+)

x_5 = Size of household (+)

x_6 = Number of dependent children (+/-)

x_7 = Gender (where male=1; male=0) (+)

x_8 = Age (+/-)

ε_{in} = Error term

The explanatory variables in equation (3.6) are house price, interest rate, household income, educational attainment, occupation, marital status, size of household and number of dependent children.

Chambers et al, (2009) imply that income growth encourages borrowers to access mortgage loans, thus the relationship between mortgage borrowing and household income is positive. Chien and DeVaney (2001) suggest that income is positively related to households with a professional or managerial occupation and exhibits a positive effect on mortgage borrowing. Munnell, et al (1996) believe that higher

educational attainment allows households to have a higher income and lower LVR, which benefit them when they borrow loans, thus education has a positive effect on mortgage borrowing. Chien and DeVaney (2001) find that households with a professional or managerial occupation are more likely to have higher incomes and benefits for mortgage purchases. Robinson's (2002) study shows that married households have a higher probability of purchasing a mortgage loan. The regression model of Elliehausen and Staten (2004) shows that household size has a positive relationship with mortgage borrowing. Hartarska and Gonzalez-Vega (2006) find that a large family size household but a lower number of dependents has a lower default risk, which makes it easier to get a mortgage from a financial agency. Ojo & Ighalo (2008) find that the probability of borrowing a mortgage loan for a male-headed family is higher than for a female-headed family. Similarly, Robinson (2002) argues that the rate of home-ownership for males is higher than for females, thus gender is positively related to mortgage borrowing. Agarwal, et al (2007) reveal there is a U-shape relationship with a mortgage and people's age, the households' willingness to borrow mortgage loans increases from twenty years of age and above, and then reaches the peak around sixty years and decreases thereafter. Therefore, the relationship between age and mortgage borrowing is either positive or negative in the difference in the age category. Therefore, the following relationships are hypothesized:

H1: The increase of household income is positively related to households' mortgage

borrowing.

H2: The higher level of educational attainment is positively related to households' mortgage borrowing.

H3: The higher occupation of households is positively related to households' mortgage borrowing.

H4: Marital status is positively related to households' mortgage borrowing.

H5: Size of household is positively related to households' mortgage borrowing.

H6: The number of dependents (children) has an impact on the households' mortgage borrowing.

H7: Gender has an impact on the households' mortgage borrowing.

H8: Age has an impact on the households' mortgage borrowing.

Research objective three examines customers' decision to purchase a house, which is also a binary choice decision model. It attempts to predict the probability of customers' decision to purchase a house influenced by social-economic factors, such as age, gender, marital status, education, and occupation. Hence, the logit model is applied. The parametric functional form of housing purchase based on households' characteristics can be written as follows:

$$Y_{in} = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9) + \varepsilon_{in} \quad (3.7)$$

Where, Y_{in} = Decision to purchase a house (where 0 = do not purchase; 1= purchase)

x_1 = Household income (+)

x_2 = Gender (where male=1; male=0) (-)

x_3 = Age (+)

x_4 = Marital status (where 1=single; 2=married; 3=others (divorced, widowed and de facto relationship) (+)

x_5 = Number of dependent children (+/-)

x_6 = Occupation (+/-)

x_7 = Educational attainment (+)

x_8 = Size of houses (+/-)

x_9 = Size of household (+/-)

ε_{in} = Error term

The explanatory variables in equation (3.7) include house price, household income, ethnic group, marital status, educational attainment, size of household, gender, age, size of houses and loans. Bourassa (1995) and Painter et al, (2001) find that a lower home-ownership rate is related to lower household income so that household income is assumed to be positively related to home-ownership. The studies of Allen (2002) and Brisson and Usher (2007) show that there are fewer female-headed families owning houses than males, but the evidence study of Law and Meehan (2013) shows a higher likelihood to own a house for females in New Zealand; therefore, gender has a negative relationship with home-ownership in our study. Green et al, (1996) and Painter et al, (2001) believe that older households have a higher demand for houses and they have more wealth to afford a house than younger households; thus age is

positively related to housing purchase decisions. Hood (1999) finds that less mobility, higher household wealth and a forecast on raising children and investment give married households a higher probability to purchase a house. Therefore, the relationship between marital status and home-ownership is positive. Mulder and Billari's (2010) study shows households with children prefer to purchase a house than households without children, and Hood (1999) believes that a stable living place and more room is required by growing family members; however, the large number of children requires an increasing daily expenditure which constrains the ability of the family to afford houses. Therefore, there is a positive relationship between the number of children and home-ownership when the dependents are under three children, and a negative effect on home-ownership with three children or more.

Clapham (2005) suggests that employment is the major source of income for households and impacts their ability to purchase a house. Courgeau and Lelièvre's (1992) study shows that households with better occupations are more likely to be home-owners than unskilled workers. Thus, employment and better occupation have a positive effect on the home-ownership of households. Gyourko and Linneman (1997) suggest that well-educated households have a higher home-ownership than poorly educated households, thus education has a positive impact on home-ownership. Gerardi et al, (2010) find that the size of the house is relevant to the households' wealth, which impacts the households' affordability, as well as income. Higher income households are more able to afford a larger size of the house. Therefore, the

size of the house is positively related to house purchase.

The following relationship is hypothesized:

H11: A higher household income has a positive impact on house purchase.

H12: Females have a higher probability to purchase a house.

H13: Increasing age of the household has a positive impact on house purchase.

H14: Marital status has a positive impact on house purchase.

H15: Number of dependents has a positive impact on house purchase.

H16: A professional occupation has a positive impact on house purchase.

H17: Higher education has a positive impact on house purchase.

H18: Large size of the house has a positive impact on house purchase.

H19: Large size of the household has a positive impact on house purchase.

3.2 Questionnaire Design

This research investigates the mortgage market post-earthquake in Christchurch based on households' decision to purchase a house. For the empirical analysis, a survey questionnaire based on previous studies is used to acquire the required data. There are six sections in the questionnaire. The first section consists of questions on the respondents' current accommodation and movement related to the earthquakes. These questions include the type of current living accommodation, size of the home, movement in Christchurch related to earthquakes, the structure of the home, loan

turndown history (including the reasons why a loan was rejected), and ownership of a home pre-earthquake.

Section two of the survey questionnaire contains detailed information of homeowners about their houses and home loans pre-earthquake, including the current status (impact of the earthquake) of their houses. The section also includes loan and borrower characteristics, such as methods of financing loans, duration of housing loans, the interest rate charged on loans, etc.

Section three of the survey questionnaire provides information about non-home-ownership in Christchurch pre-earthquake. The questions include information about the houses of the respondents and general information about their previous financing constraints pre-earthquake. Factors impacting home-ownership are measured by a six-point Likert scale for the degree of importance of each factor; where 1 indicates very important, 5 not important at all and 6 indicates "do not know". The Likert scale evaluates the degree of importance of each factor, which influences the decision of consumers to not own a house.

Section four of the survey questionnaire contains information of homeowners about their houses and home loans post-earthquake. The questions ask the respondents the reasons they purchased a house post-earthquake, the impact of earthquakes on insurance and housing issues related to earthquakes. The questions are designed to understand the changes in the respondents' housing purchase decision and home loan financing post-earthquake.

Section five measure reasons why non-homeowners do not own a house post-earthquake. The questions include their current housing arrangement, loan history, reasons for not owning a house and attitude toward future home-ownership post-earthquake.

Section six contains a series of questions to seek information regarding the respondents' demographic and socio-economic characteristics. The socio-demographic characteristics variables include the respondent's age, gender, occupation, education, household income, marital status, raising dependents and location. These variables are included in the study to investigate the possible impact on the respondents' housing purchase and mortgage decision. These questions are in the last section of the survey questionnaire in order to minimise the possibility of respondent alienation influence.

A total of 10 household residents was randomly selected from Christchurch aged 18 years and older to pre-test the questionnaire. The objective of the pre-test was to improve the contents, including questions, clarity, instructions, and the layout of the questionnaire based on the feedback from the 10 sample households. Moreover, the pre-test helped to improve the questionnaire, including the reliability of the constructs and the effectiveness of the measures used. The questionnaire used in this study is included in Appendix B.

3.3 Data and Sampling Method

Relevant data were collected from Christchurch household residents of both

homeowners and non-homeowners. The survey questionnaires were mailed to Christchurch households from October 2015 to November 2015. The mailing list of the respondents was randomly obtained from the electronic White Pages. The current study used a mail survey to reach a wider population in Christchurch. This questionnaire survey excluded respondents aged less than 18 years, who might have difficulties in interpreting the survey questions.

The survey comprised a copy of the cover letter and the survey questionnaire. A total of 425 respondents mailed back the questionnaire, representing an overall response rate of 42.5% (425/1000). The remaining 57.5% were refusals, bad addresses, and not-at-homes. A further 24 returned surveys were incomplete responses that lacked personal or household information, thus resulting in 401 completed questionnaires (40.1%) used in this study.

The questionnaire included the following information: 1) home-ownership of respondents, 2) type of home owned, 3) factors affecting the house purchase, 4) financing option selected, and 5) standard demographic characteristics. The survey measurement used three types of scales: Likert scales and close-ended and open-ended, depending on the purpose of each question.

Completing the questionnaire was voluntary, and respondents were free to quit at any time throughout the process of filling in the questionnaire and without prejudice, including withdrawal of any information they have provided. The questionnaire was anonymous, which assured complete anonymity of the survey. Moreover, anonymity

was ensured by the design of the questions so that none of the questions could be used to identify the respondent as an individual. Lastly, all responses were aggregated for analysis only, which meant no personal details were reported in the thesis or any resulting publications. All the respondents who returned the questionnaire understood they were volunteers for this survey.

3.4 Sample size and response rate

The target population of this study was people currently living in Christchurch. Christchurch was chosen as the study area because it was severely affected by the 2010 earthquake. The sampling frame was primary householders aged 18 or older. This study was based on a 95% confidence interval (z) and an estimated sampling error (e) of 5%. According to the data of SNZ (2013), there were a total of 159,450 households in Christchurch in 2013, so thus the sample size (n) can be calculated by the formula given by Zikmund (2003):

$$n = \frac{N}{1 + N(e)^2} = \frac{159,450}{1 + 159,450(0.05)^2} = 399 \text{ respondents}$$

(3.9)

The total required survey questionnaires were 399. A total of 1000 questionnaires were mailed out to ensure enough replies to avoid a lower responding probability compared with face to face interviews.

3.5 Summary

Chapter three discussed the data and methodology used in the research, and the

questionnaire design, data, sampling method, data collection and sample response rate. Following this, Chapter Four discusses the empirical findings, the hypothesis test results, and the research findings.

Chapter 4

Research Findings

4.0 Introduction

Chapter Four uses SPSS (Version 22.0) and Stata (14.0) to generate the frequencies and descriptive statistics from the respondents of the survey. The chapter also discusses the results of the hypotheses relating to the study objectives, empirical results, and findings.

4.1 Descriptive Statistics of the Respondents

SPSS (Version 22.0) was used to generate descriptive statistics of the homeowner and non-homeowner respondents during pre- and post-earthquake in Christchurch. Table 4.1 shows the descriptive statistics of both homeowners and non-homeowners during pre- and post-earthquake in Christchurch. From the 401 useable responses, there were 358 (89.3%) respondents who lived in Christchurch before the earthquake, 30 (7.5%) came to Christchurch after the earthquake and 13 (3.2%) left Christchurch temporarily due to the earthquake, at the end of 2015. The 371 respondents who lived in Christchurch before the earthquake, 310 (83.6%) are homeowners. Further, there were a total 342 (85.3%) respondents who owned one or more houses post-earthquake. The rest of the 59 respondents were householders who are non-homeowners both pre- and post-earthquake or lost their home post-earthquake in Christchurch.

The socio-economic characteristics of the respondents are presented as follows. The gender of the respondents comprises 217 (54.1%) females and 184 (45.9%) males. Further 261 (65.1%) of the respondents are in the age group of over 55 years. In

terms of marital status, 10% of the respondents never married and 90% are married or in a de facto relationship (3.7%). Additionally, in the married group, there are 30.4% of the respondents who are of single status, divorced and widowed. In terms of education, most of the respondents completed an undergraduate degree (159 or 39.7%) followed by high school graduates (140 or 34.9%). Similarly, with the occupation, most of the respondents are retired (38.9%) followed by professional (18.7%) and managers (0.9%). The result shows 19% of the respondents have an over $95,000 annual household income followed by 18.0% between $50,000 and $65,000, and 16% between $20,000 and $35,000. In terms of work duration, the survey result shows 340 (84.8%) of the respondents have worked for more than 12 years followed by 35 (8.7%) respondents between 6-11 years. From the surveyed respondents, 142 (35.4%) couples have no children while 116 (28.9%) have children. The survey sample also showed 166 (41.4%) of the households have two people. Additionally, 66.1% of the households have zero dependents (followed by 111 (27.7%) households with 1 to 2 dependents and 6.2% with 3 to 4 dependents.

4.1.1 Socio-economic characteristics pre-earthquake

There are 371 respondents who lived in Christchurch during the pre-earthquake period. Table A.2 presents the socio-economic characteristics between homeowners and non-homeowners during the pre-earthquake period. The table shows 310 responses are homeowners and 61 non-homeowners. In terms of homeowners, 56.1% are females and most are aged over 65 years (43.5%). In contrast, the majority of

non-homeowners are males (54.1%) and in the age group of 55 to 64 years of age (36.1%). Similarly, in terms of marital status, 64.2% of homeowners and 67.2% of non-homeowners are married.

In terms of education, 39.7% of homeowners have an undergraduate degree followed by 35.5% of high school graduates, while 39.3% of non-homeowners are high-school graduates and 36.1% have an undergraduate degree. The survey result also shows 21.9% of the homeowners hold professional jobs followed by sales (14.8%) compared to 13.1% non-homeowners who are laborers. In termss of annual household income, 20.6% of homeowners have incomes over $95,000 followed by 19.4% in the income group of $50,001 to $65,000. Similarly, 19.7% non-homeowners have an annual income of $20,001 to $35,000 and 19.7% have an annual income of less than $20,000. For the duration of employment, the majority of the homeowners have worked over 12 years (90.3%) compared to 73.8% of non-homeowners. Table A.2 also shows most of the homeowners have two family members (39.4%) followed by couples with children (24.8%) and single (24.2%). The majority of non-homeowners are couples with children (41%) followed by one adult family (31.1%). The survey result shows 70.6% of homeowners have zero dependents while most of the non-homeowners have more than one dependent. For instance, 27.9% of the non-homeowners have one member followed by 26.2% with three members, 26.2% with two members and 19.7% of the respondents have more than four members. With regard to the number of dependents, 50.8% off non-homeowners have zero dependents followed one to two dependents (47.5%).

4.1.2 Socio-economic characteristics post-earthquake

Table A.3 shows the descriptive statistics between homeowners and non-homeowners post-earthquake in Christchurch. There are 52.6% females who owned houses compared to 62.7% female non-homeowners. Further 39.8% homeowners are over 65 years of age while 39% of the non-homeowners are in the age group of 55 to 64 years of age.

In terms of marital status, most homeowners and non-homeowners are married (67.8% and 54.2%, respectively). For educational attainment, the majority of the homeowners have an undergraduate degree (40.1%) followed by high school graduates (33.6%) compared to 42.4% non-homeowners as high school graduates (42.4%). In terms of occupation, 38.9% of the homeowners have retired, followed by professionals (21.1%) and 13.6% of the non-homeowners are laborers.

Table A.5 shows 38.9% of the homeowners are retired, followed by professionals (21.1%) while 13.6% of the non-homeowners are laborers. The majority of the homeowners (68.4%) have an annual income of more than $50,001, 21.6% of the homeowners have an over $95,000 annual income and 68.4% have more than $50,001. However, the majority of the non-homeowners (over 70%) have an annual income of less than $50,000. In terms duration of employment, the majority of the homeowners (86.5%) and non-homeowners (74.6%) have worked for more than 12 years. Similarly, in the family category, 37.4% of the homeowners are couples with no children followed by 30.4% with children. However, the majority of the non-homeowners are

single (35.6%) while 66.1% of homeowners and non-homeowners have no dependents in their family

4.2 Empirical Analysis

The surveyed respondents comprise four groups: homeowners and non-homeowners during pre-earthquake and post-earthquake periods in Christchurch. The data were used to generate descriptive frequencies and logistic regression analysis. Survey questions that were left blank by the respondents were treated as missing variables and coded as -9. All the social-demographic factors were coded as dummy variables, e.g. gender was coded as 1 for male and 0 for female. The main survey question was a binary choice question: purchase or did not purchase a mortgage loan. Thus, a logistic regression is used to estimate the data.

Before the logit regression was estimated, a correlation analysis was estimated between the independent variables of the two models to identify a possible correlation between the independent variables. The Pearson Correlation test was conducted to identify possible correlation via SPSS software (Version 24.0) and Stata software (version14) was used to estimate the logit models. Based on the results in Tables A.5 to A.9 in the Appendix, correlations between independent variables were under 0.50. Therefore, there was no significant correlation between the independent variables of the study model. The variance inflation indicators are shown in Tables 4.4, 4.6, 4.9 and 4.10. Most of the VIFs are under 10 and some are a little higher than 10. Thus, there is minimal multicollinearity between the variables of the study models (model 1, model 2, model 3 and model 4).

4.3 Results Pertaining to Research Objectives

4.3.1 Research Objective One: To provide an overview of the housing market in pre- and post-earthquake periods in Christchurch

Figure 4.1 Homeowners and Mortgage Borrowers in Pre-and Post-Earthquake Periods in Christchurch

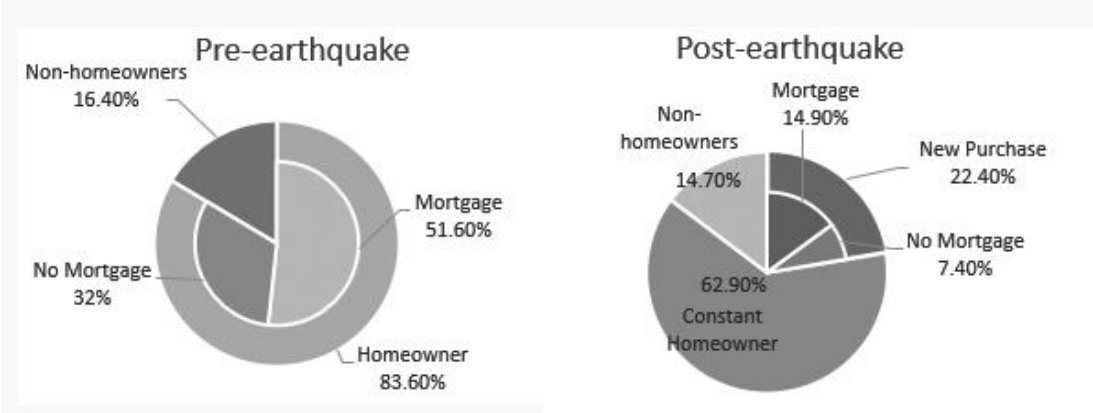


Figure 4.1 result shows 310 (83.6%) of the respondents were homeowners during the pre-earthquake period and 342 (85.3%) owned one or more houses in the post-earthquake period. Of the 310 homeowners in the pre-earthquake period, 192 (51.6%) chose to borrow a mortgage to pay for their house. Further, of the 90 of the respondents who bought their house post-earthquake, 60 (67.8%) used a mortgage loan to finance their house. The survey result also shows that 20 of the 59 non-homeowners in the post-earthquake period have planned to purchase a house in the near future.

The survey result shows that of the 310 homeowners in the pre-earthquake period, 263 (84.8%) reported that their house was damaged by the earthquake. Table A.6 shows most of the respondents chose the "managed repair option" (60.8%) to repair

their houses, followed by 26.6% who used cash, 2.3% who used both options and 10.3% who did not use either option to cover their repair fees. The majority of the homeowners (64.6%) revealed that their house needs minor repair, 30% of the houses required major repair and 5.3% of the houses had been totally destroyed. Table A.4 also indicates that 59.3% of homeowners whose houses were damaged in the earthquakes lived in their houses while the repair was ongoing and 34.6% of the homeowners chose to rent or live with their relatives or friends. Only 16 respondents (6.1%) bought a new house. For most of the homeowners (60.5%) insurance fully covered their repairs, while 26.2% of homeowners did not get any help from their insurance company.

Table 4.1 House Buyers Post-Earthquake

Frequency(Percentage)		New Migrants	Lost House	Investment	Increasing house price	Life Plan
New Homeowners	39(43.3%)	8(8.9%)	2(2.2%)	0(0%)	2(2.2%)	23(25.6%)
					4(4.4%)*	
Change House	19(21.1%)	0(0%)	4(4.4%)	3(3.3%)	0(0%)	12(13.3%)
Keep and Buy	32(35.6%)	0(0%)	7(7.8%)	13(14.4%)	0(0%)	12(13.3%)
Total	90(100%)	8(8.9%)	13(14.4%)	16(17.8%)	2(2.2%)	47(52.2%)
*: 4(4.4%) means four new home buyers bought house both for anticipated increase in house price in the future and their life plan (plan for their future).						

Source: Author's calculation based on 2015 Survey

The survey result shows 90 (22.4%) of the respondents bought a house post-earthquake, where 12 new homeowners are new migrants to Christchurch. There are three types of home-ownership: homeowners who bought a new house while holding the old house, new homeowners in the post-earthquake period and homeowners who changed to another house post-earthquake (see Table 4.1). Table 4.1

shows 32 (7.9%) of the respondents bought a new house while they still kept their old house post-earthquake, including 18 new migrants from other areas. The result shows 7 (21.9% of 90 homeowners) homeowners bought a new house due to the earthquake; 13 (40.6%) bought for investment purposes and 12 (37.5%) regarded the house as necessary for living. From Table 4.1, most of the house buyers bought a house for living in post-earthquake. In terms of the 90 house buyers displayed in Table 4.1, the result shows 19 of the respondents needed minor repairs on their houses and 19 needed major repairs post-earthquake and 4 of the house were totally destroyed.

Table 4.2 Mortgage Borrowers Post-earthquake

<table>
<tr><td></td><td>Pre-earthquake</td><td colspan="4">Post-earthquake</td></tr>
<tr><td rowspan="5">Rate of Mortgage borrowing</td><td rowspan="5">192(61.9%)</td><td rowspan="5">61(67.8%)</td><td rowspan="4">Pre-earthquake</td><td>Current Paying</td><td>25(27.8%)</td></tr>
<tr><td>Reconstructed</td><td>2(2.2%)</td></tr>
<tr><td>Fully Paid</td><td>1(1.1%)</td></tr>
<tr><td>Total</td><td>28(31.1%)</td></tr>
<tr><td>New Mortgage borrower</td><td></td><td>33(36.7%)</td></tr>
<tr><td>Mortgage rate (Average)</td><td>1.28</td><td>1.74</td><td></td><td></td><td></td></tr>
</table>

Source: Author's calculation based on the 2015 Survey

Table 4.2 shows the rate of homeowners borrowing mortgages pre-earthquake and post-earthquake. With regard to the 90 new homebuyers, 61 (67.8%) of them used a mortgage to pay for their house. Compared with mortgage borrowing rates pre-earthquake and post-earthquake, homeowners post-earthquake were more willing to borrow home loans than those in the pre-earthquake period. Additionally, of the 61 respondents who borrowed a mortgage loan in the post-earthquake, 31.1% (28 new homeowners) of them had already borrowed a mortgage for their house before the earthquake. Only one of the 28 respondents fully paid off the mortgage in the

pre-earthquake period. The other households were still paying off their mortgages (25 respondents) and 2 respondents restructured their mortgage. Similarly, among the 28 mortgage borrowers, 82.1% of them bought a new house as well as keeping their old house.

Table 4.2 also shows the mortgage interest rate the borrowers pay. In the questionnaire, the repayment interest rate was asked in weekly terms: less than $500, $501 to $750, $751 to $1000, $1001 to $1250 and over $1251. To analyse the changes in mortgage interest rate repayment for the borrowers in the pre-earthquake and post-earthquake periods, Table 4.2 shows the average mortgage repayment rate (five choices of interest rate repayment in the questionnaire: $500, $501 to $750, $751 to $1000, $1001 to $1250 and over $1251 represented by 1, 2, 3, 4 and 5). Based on Table 4.2, the average mortgage rate is 1.28 in pre-earthquake and 1.74 in the post-earthquake period. The higher average mortgage rate in the post-earthquake period indicates that mortgage borrowers paid a higher mortgage rate than borrowers in the pre-earthquake period.

Table 4.3 Changes in Home-ownership Post-earthquake, Christchurch

		Number	Percentage
Change House	No Damage	3	3.85%
	Minor Repair	11	14.10%
	Major Repair	4	5.13%
	Destroyed	1	1.28%
	Total	19	24.36%
Buy and Hold	No Damage	5	6.41%
	Minor Repair	8	10.26%
	Major Repair	15	19.23%
	Destroyed	4	5.13%
	Total	32	41.03%
Lost House	No Damage	3	3.85%
	Minor Repair	2	2.56%
	Destroyed	2	2.56%
	Total	7	8.97%
Buy new House		20	25.64%
Total		78	100.00%

Source: Author's calculation based on the 2015 Survey

Table 4.3 shows the changes in home-ownership post-earthquake for the households who had lived in Christchurch during the pre-earthquake period. The result shows 78 (21%) of the households who lived in Christchurch pre-earthquake changed their home-ownership post-earthquake: homeowners who bought another house (19 respondents), homeowners who bought a new house while keeping the old house (32 respondents), homeowners who lost their home without buying a new one (7 respondents), and totally new homeowners (20 respondents) post-earthquake. Based on Table 4.3, 71 (91%) of the households bought a new house post-earthquake, while 9% had not bought a new one during the time of the survey. In Table 4.3, 7 of the 78 respondents (9%) reported that their houses had been totally destroyed by the earthquake, and 19 (24%) of the respondents' houses needed major repairs which

required them to move out temporarily. There were also 21 houses which needed minor repairs and 11 houses with no damage.

In terms of the houses that were destroyed by the earthquake, one of the respondents bought a new house and was no longer holding the previous house, and four of the respondents bought a new house, one while keeping their existing house. Two households preferred to own their house in the near future. The households whose houses were under repair have already bought a new house post-earthquake. Besides, only one respondent did not have a plan to buy a house post-earthquake. This result implies that most of the respondents lost their house temporarily and are potential homeowners in the future (with a house purchase plan). Additionally, 2 of the 78 households who left Christchurch post-earthquake returned later, and both bought new houses (their old houses required minor repairs).

According to the survey results, for 26 homeowners (28.9%) who bought new dwellings after the earthquake, the construction duration was less than 5 years at the time of the survey. The majority of the new dwelling owners were new homeowners, (57.7% were not homeowners before the earthquake, or not in Christchurch), and 23.1% homeowners bought a new house while holding the previous one and the rest of the homeowners (5%) changed their house post-earthquake. Compared with the rate of new dwelling purchases during the pre-earthquake period, 92 (24.5% of 371 respondents) homeowners bought new dwellings. However, the questionnaire only surveyed their current house. Therefore, of the 92 new dwelling buyers during the pre-earthquake, 16 respondents recorded their new house post-earthquake. Eventually,

only 20.5% of the respondents could be confirmed correctly as new dwelling buyers pre-earthquake. This result shows that the rate of new dwelling buyers post-earthquake is higher than in the pre-earthquake period.

In summary, there are changes in the housing and mortgage markets of Christchurch since the earthquake. The rate of home-ownership was fairly high before the earthquake, while the proportion of home-ownership exhibits an increased trend in the post-earthquake period. According to the survey, some non-homeowners answered that they have plans to purchase a house so that the proportion of home-ownership is anticipated to rise in the future.

4.3.2 Research Objective Two: To identify post-earthquake factors based on socio-economic factors that affect households' mortgage loans in Christchurch

Tables 4.4 and 4.6 show the empirical result of the logistic regression mortgage loan (pre- and post-earthquake) and the goodness-of-fit measurement (McFadden Pseudo R- squared) of both models

The dependent variable measures the respondents' decision to purchase a mortgage loan or not to purchase a loan as a binary choice. The explanatory variables of the logit model (equation 3.6) include gender, age, marital status, educational attainment, occupation, household income, number of family members and number of dependents. Gender is coded as a dummy variable, with female equal to 0 and male equal to 1. Age is divided into three groups: young age (younger than 34 years), middle age (35

to 54 years), and old age (over 55 years). Marital status is categorized as single, married and other (divorced, widowed and de facto relationship). Educational attainment includes primary school or lower, high school, undergraduate and postgraduate. Occupation is divided into four groups: other (student, unemployed and retired), normal company staff (clerical, laborer and machinery operator), middle professional (manager, community, and sales), and professional (professional and technician). The annual household income is divided into low-income household (lower than $35,000), middle-income household ($35,001 to $65,000), and high household income ($65,001 and above). The number of family members in a household includes four groups: one member, two members, three members, and four and above. Similarly, the number of dependents in a household is divided into four groups: zero dependents, one to two dependents, three to four dependents, and five and above.

Table 4.4 shows the model fits the regression pre-earthquake data. The observations are from households who lived in Christchurch during the pre-earthquake period. There are three variables in 5% significant level and one variable in 1% level. Moreover, the majority of the parameter estimates support the hypothesis in Chapter 3. The chi-squared test strongly rejects the hypothesis of no explanatory power.

Table 4.4 Estimated Logit Results of Mortgage Loans Pre-Earthquake （Model 1）

Number of observations = 371					
Log Likelihood = -237.54982					
Pseudo R-squared= 0.0754					
Chi Squared=38.76					
Degree of freedom= 8					
Prob[ChiSqd> value] = 0.000					
Percentage of Right Predictions= 63.9%					
Mean of VIF=4.30					
Variables	Coefficient	Standard Error	P-value	Marginal effect	VIF
Gender	-0.532**	0.230	0.021	-0.132	1.95
Age (≥35)	1.558**	0.633	0.014	0.341	9.23
Marital Status (Married)	-0.540	0.400	0.176	-0.131	10.26
Education (Under graduate)	-0.232	0.241	0.336	-0.058	2.96
Occupation (Middle Professional)	0.571**	0.243	0.019	0.141	2.05
Income (High Range)	0.767***	0.280	0.006	0.189	4.78
Size of Household (More than Two)	0.507	0.260	0.051	0.125	1.95
No. of Dependents (More than two)	0.952	0.551	0.084	0.220	1.20
, * denotes statistically significant at the 0.05 and 0.01 level of significance, respectively					

Source: Author's calculation based on the 2015 Survey

Gender significantly affects households' purchase of a mortgage loan at the 5% level. However, the coefficient of gender is negatively related to mortgage purchase, which contradicts our pre-hypothesised sign. The result implies that there was a higher probability for females to purchase a house than males before the earthquake in Christchurch. This is opposite to the findings of Ojo and Ighalo (2008) and Robinson (2002), where men have a higher likelihood to borrow home loans. One of the reasons related to the negative coefficient is the gender of the respondents. According to the survey, more females answered the questionnaire (54.4%) than males in the model. Another reason, according to a research on New Zealand home-ownership, Law and

Meehan (2013) show that females have a higher probability of owning a house in New Zealand. The higher rate of home-ownership may result in a higher rate to borrow to buy a house.

The age of the household is statistically significant at the 5% level and the coefficient is consistent with the hypothesized sign. The finding implies that the probability of purchasing a mortgage loan for a household increases with the age of the respondent, and it is less likely for young age households to purchase mortgages than older households. Table 4.4 shows the largest proportion of homeowners is in the age group older than 55 years (68.4%) while the age group between 25 to 35 years is the smallest. Schors, et al.'s (2006) study shows households in the young age group are less likely to borrow a mortgage and the highest probability for households to borrow home loans is around the age of 45 years. Further, younger age households have lower accumulated wealth and income to own a house. Therefore, the older group has a higher ability and probability to purchase a house. The result is also consistent with Agarwal et al's (2007) study which shows that there is a U shape relationship between mortgage borrowing and households' ages.

The marital status coefficient is negative and is insignificant with a mortgage purchase. The result shows that singles have a higher probability of borrowing a mortgage loan. The result is inconsistent with the findings of Black et al. (1978), Robinson (2002) and Hartarska and Gonzalez-Vega (2006). These authors' studies show a lower probability for a single household to get a mortgage than married households. Table A.2 shows that the rate of home-ownership for the married group is

higher than for the never married group. Hood (1999) thinks that married households may pool their income and their higher household wealth enables them to afford a house quite easily. Therefore, they are less likely to borrow to pay for their house.

The education coefficient is statistically insignificant and is inconsistent with the sign as hypothesized. The survey data shows that the respondents with an undergraduate degree exhibit the highest probability to purchase a mortgage. This result is consistent with the hypothesis and Munnell et al's (1996) study which shows a higher educational level is related to a higher income and better tolerance of loans. One of the reasons is that there were six respondents with primary school education and all were homeowners in the pre-earthquake period. Moreover, all homeowners in the primary school group borrowed to pay for their house. Therefore, the rate of mortgage is 100% for the primary school education group and is absolutely higher than the mortgage rate of other groups. The sample of the primary school education group is small (only 6 respondents) and the result is weak, so we dropped the group in our model. By ignoring the primary group, the proportion of borrowing loans for the undergraduate group is higher than the high school group. Thus, the result is positive and consistent with the study of Munnell, et al. (1996).

The occupation coefficient is positive and statistically significant at the 5% significance level on the decision to purchase a mortgage loan. The result implies that a respondent with a higher professional occupation has a higher probability to purchase a mortgage loan. This is supported by Reichert's (1990), and Chien and DeVaney's (2001) studies where they find that professional and managerial

occupations suggest higher incomes, which makes it easy for households to repay mortgage loans.

The household income is positive and statistically significant at the 1% significant level as hypothesized. The result implies that respondents with a higher household income are more likely to borrow a mortgage to buy a house. Higher household income suggests stronger capability to afford a down payment and repay interest. This is also consistent with the findings of Ortalo-Magne and Rady (2006), Chambers et al (2009), Archer et al (1996), and Linneman and Wachter (1989), whose studies show an increase in household income increases the probability of borrowing a house loan.

The coefficient of household size is consistent with the hypothesis and is statistically significant at the 5% level. This result implies that households who have a large family size are more likely to borrow a mortgage to buy a house. Our results support the findings of Elliehausen and Staten (2004) and Gerardi et al. (2010) who show the relationship between the size of household and mortgage borrowing is positive and significant.

Finally, the size of dependents (with children) is statistically insignificant. But the coefficient is positive and consistent as hypothesized. The positive sign indicates that the more dependents in a family, the higher the probability to borrow a mortgage. This is consistent with the studies of Pryce and Keoghan (2002). The authors found that households with a large number of children have a lower probability to take-up mortgage payment insurance (insurance which guarantees borrowers will pay their mortgage) because of their stable employment to afford their mortgage. Thus, the

large dependents' households find it easier to get mortgages from financial companies.

Table 4.5 shows the model fits the mortgage purchase data post-earthquake. The observations are from households who lived in Christchurch post-earthquake. The results show two factors are significant at the 1% level and one at the 5% level, and the majority of the coefficient signs of these factors are consistent with the hypothesis. The chi-squared test also strongly rejects the hypothesis of no explanatory power.

Table 4.5 Estimated Logit Results of Mortgage Purchase Post-earthquake (Model 2)

Number of observations =401					
Log Likelihood =-243.45743					
Pseudo R-squared= 0.1145					
Chi Squared= 62.99					
Degree of freedom= 8					
Prob[ChiSqd> value] = 0.000					
Percentage of Right Predictions= 67.3%					
Mean of VIF=4.19					
Variables	Coefficient	Standard Error	P-value	Marginal effect	VIF
Gender	-0.126	0.227	0.580	-0.031	1.98
Age (≥35)	0.966	0.503	0.055	0.236	8.94
Marital Status (Married)	-0.012	0.379	0.975	-0.003	9.95
Education (Under graduate)	-0.232	0.237	0.328	-0.056	2.97
Occupation (Middle Professional)	1. 021***	0.240	0.000	0.242	2.08
Income (High Range)	0.634**	0.264	0.016	0.156	4.45
Size of Household (More than Two)	0.935***	0.262	0.000	0.221	1.98
No. of Dependents (More than two)	0.666	0.592	0.261	0.152	1.19
, * denotes statistically significant at the 0.05, 0.01 level of significance, respectively					

Source: Author's calculation based on 2015 Survey

Table 4.5 shows beside occupation, the correlation (positive or negative) between the dependent variable and the independent variables of the two models (pre- and

post-earthquake) are the same.

Compared to the significance of the independent variables in model 1 and model 2, most of them have changed. Gender and age are significant at the 5% level but no longer significant in model 2. This means the two factors do not impact the decision of the borrowers to borrow mortgages post-earthquake. And the number of dependents is significant at the 1% level in model 2 while insignificant in model 1. It indicates that the number of dependents impacts the households' choice on borrowing home loans. These changes indicate that the earthquake affected socio-economic factors on mortgage purchase. The significant of the occupation coefficient indicates a more sensitive relationship between occupation and mortgage purchase, that is occupation becomes a more important deciding factor in mortgage borrowing during the post-earthquake period. From the marginal effect, occupation ranks 1st, followed by age and size of household. On the contrary, income becomes less important post-earthquake compared during the pre-earthquake period, the marginal effect of income has dropped to 4th post-earthquake period. Marital status, educational attainment and number of dependents are insignificant in both model 1 and model 2. The test results of hypotheses 1 to 8 in pre-earthquake and post-earthquake models are shown in Table 4.6.

Table 4.6 Test Results of Hypotheses 1 to 8

Hypothesis	Pre-earthquake	Post-earthquake
H1: Household income is positively related to households' mortgage borrowing.	√	√
H2: Educational attainment is positively related to households' mortgage borrowing.	**x**	x
H3: Occupation of household members is positively related to households' mortgage borrowing.	√	√
H4: Marital status is positively related to households' mortgage borrowing.	**x**	x
H5: Size of household is positively related to households' mortgage borrowing.	√	√
H6: Number of dependent children is positively related to households' mortgage borrowing.	**x**	x
H7: Gender is positively related to households' mortgage borrowing.	**x**	x
H8: Age is positively related to households' mortgage borrowing.	√	x

Note: √ (supported) and x (not supported)

Table 4.7 Marginal Effect of Pre-earthquake and Post-Earthquake Models

	Pre-earthquake		Post-earthquake	
Variables	Marginal effect	Ranking	Marginal effect	Ranking
Gender	-0.132	5	-0.031	7
Age	0.341	1	0.236	2
Marital	-0.131	6	-0.003	8
Education	-0.058	8	-0.056	6
Occupation	0.141	4	0.242	1
Income	0.189	3	0.156	4
Size of household	0.125	7	0.221	3
No. of Dependents	0.220	2	0.152	5
Summary of absolute value	1.337		1.097	
Averaged absolute value	0.167		0.137	

Source: Author's calculation based on a 2015 Survey

The marginal effect implies the magnitude of the effect of an independent variable on the dependent variable. In an econometric model, a marginal effect is the partial derivatives of the probability function with respect to the mean of each covariate (Basu, & Rathouz, 2005). Therefore, the marginal effect indicates the important level of the estimated coefficients in the empirical model. Table 4.7 shows the marginal

effect of each variable estimated in the mortgage purchase models, pre- and post-earthquake. This result could be used to identify the importance of each variable that impacts a house buyer's decision to use a mortgage loan to buy a house.

In the pre-earthquake model (see Table 4.4) the marginal effect shows that a unit increase in gender (male) implies that there is a 13.2% probability that male respondents will not borrow a mortgage loan to buy a house. However, a unit increase in the age factor will result in 34.1% probability that the respondents will choose to borrow a mortgage loan to buy a house. With regard to marital status, a unit increase in the married group will result in 13.1% probability of a decrease in the respondents' choice to purchase a mortgage. A unit increase in education will mean a 5.8% drop in mortgage purchase. In contrast, a unit increase in occupation will result in a 14.1% increase in the probability of purchasing a mortgage loan. A unit increase in income will result in a 18.9% increase in respondents' mortgage purchase. For the size of household, a unit increase in the number of family members will result in 12.5% increase in the probability of mortgage borrowing. Moreover, a unit increase in the number of dependents in a family will result in a 22% probability of borrowing a mortgage loan.

Table 4.7 also shows the marginal effect of the post-earthquake model. The result shows a unit increase (male) in gender will have 3.1% decrease in the respondents' choice of mortgage purchase. A unit increase in age will result in a 23.6% increase in mortgage purchase. Similarly, a unit increase in marital status and education will result in 3%, and 5.6% decrease in the respondents' use of a mortgage to pay for their

house, respectively. A unit increase in occupation will have a 24.2% probability of an increase in mortgage borrowing. The last three factors, income, size of household and number of dependents have positive and significant effects on mortgage borrowing. A unit increase of the three factors will result in an increase in the probability of borrowing home loans of 15.6%, 22.1%and 15.2%, respectively.

Comparing the marginal effect in pre-earthquake and post-earthquake models, there is a higher correlation between the independent variables and dependent variable in pre-earthquake than in the post-earthquake model. In Table 4.7, comparing all the pre- and post-earthquake factors, the marginal effect in the pre-earthquake model is higher than 12.5% (excluding the 5.8% of the education), whereas there are more marginal effects in the post-earthquake model lower than 5.6%. Moreover, the absolute values of marginal effects in the pre-earthquake model are significantly higher than in the post-earthquake model. This indicates that the relationships between mortgage borrowing and independent factors in the post-earthquake model are less sensitive than those in the pre-earthquake model.

On the other hand, the rankings of the eight factors are totally different in the pre-earthquake and post-earthquake models. The most significant changes are reported in size of household. Table 4.7 shows that the size of household ranks in 7th in the pre-earthquake model but ranks in 3rd in the post-earthquake model. It reflects that the size of household is the most sensitive factor that affects the households' mortgage borrowing post-earthquake compared with the pre-earthquake model. Similarly, the occupation variable also showed an obvious change, the sensitivity of

occupation increases into the first in the post-earthquake model while it ranks 4th in the pre-earthquake model. On the contrary, the ranking of the number of dependents decreases to 5th in the post-earthquake model while it ranks 2nd in the pre-earthquake model. Similarly, Table 4.7 also shows that the sensitivity of gender and marital status exhibit a decrease, both dropped two ranking, from 5th to 7th and 6th to 8th, respectively. Conversely, education ranks from 8th in pre-earthquake model to 6th in post-earthquake model. However, the sensitivity of education actually exhibits a decline, from 5.8% to 5.6%. The ranking of age dropped slightly from 1st to 2nd in the post-earthquake model. Therefore, Table 4.7 reflects the sensitivity between those factors and mortgage purchase changed post-earthquake. The impact of those factors on mortgage purchase decision for households are totally different from the pre-earthquake.

In summary, the changes to model 1 and model 2 show that the earthquake has a significant impact on Christchurch mortgages. The marginal effect shows that after the earthquake the relationship between mortgage purchase and the social-economic factors is less sensitive than in the pre-earthquake period.

4.3.3 Research Objective Three: To determine the socio-economic factors affecting the consumer's housing purchase decision post-earthquake in Christchurch.

Table 4.8 and Table 4.9 show the impact of socio-economic factors on Christchurch housing purchasing pre-earthquake and post-earthquake, respectively.

The estimated results in Table 4.8 show that the model fits the regression data. The chi-squared test strongly rejects the hypothesis of no explanatory power. The majority of the parameter estimates support the original hypotheses developed in Chapter 3. Two of the factors have a significant impact on the probability of a house purchase at the 1% significance level, and three factors are significant at the 5% significance level.

Table 4.8 Estimated Logit Results of House Purchase Pre-earthquake（Model 3）

Number of observations =371					
Log Likelihood =-129.85088					
Pseudo R-squared= 0.2169					
Chi Squared= 71.92					
Degree of freedom= 9					
Prob[ChiSqd> value] = 0.000					
Percentage of Right Predictions= 84.9%					
Mean of VIF=4.35					
Variables	Coefficient	Standard Error	P-value	Marginal effect	VIF
Income (High Range)	0.934**	0.381	0.014	0.109	4.82
Gender	-0.721**	0.337	0.032	-0.072	1.95
Age (≥35)	2.305***	0.631	0.000	0.426	9.43
Marital Status (Married)	-0.716	0.557	0.199	-0.055	10.55
Number of Dependents (More than Two)	1.145	1.074	0.286	0.076	1.20
Occupation (Middle Professional)	0.565	0.455	0.214	0.049	1.50
Education (Under graduation)	-0.307	0.360	0.394	-0.029	3.01
Size of house (More Than Four)	2.122***	0.370	0.000	0.314	4.81
Size of households (More than Three)	-0.896**	0.386	0.020	-0.097	1.91
, * denotes statistically significant at the 0.005 and 0.01 level of significance, respectively					

Source: Author's calculation based on the 2015 Survey

The dependent variable is coded as a dummy variable based on the respondents'

decision to buy or not to buy a house. Compared with the two models in research objective 2, the size of the house is the new independent variable. The size of the house is measured by the number of bedrooms and divided into three groups: 1 to 2 bedrooms, 3 to 4 bedrooms, and over 5 bedrooms.

Table 4.8 shows the income coefficient is positive and statistically significant at the 5% level. The result indicates that households with higher incomes exhibit a higher probability to purchase a house. Our result is similar to the findings of Bourassa (1995) and Painter et al (2001). A higher income enables the household to improve their wealth holding to afford a house as well as to pay for the down payment.

However, the gender coefficient is statistically significant at the 5% level and is negatively related to house purchase. This result in consistent with the research of Law and Meehan (2013) on New Zealand house affordability, where women are more likely to purchase a house than men in New Zealand. Statistics New Zealand reports that females have a higher under-employment rate than males in New Zealand because they take more part-time jobs.

Age is statistically significant at the 1% level and has a positive effect on house purchase as hypothesized. This finding suggests that as the age of the household increases, there is a higher probability that they will own a house. The research of Painter et al. (2001), Feijten et al. (2003), Manrique and Ojah (2003) and Green et al. (1996) support this result. They find that the accumulated household wealth from their earnings enables older households to have a better capacity to buy a house and stimulates their attitude to own their house. The empirical results of these researchs

show that there is a higher probability of owning a house by older households.

The marital status is negatively related to house purchase but insignificant. The result shows being single means the lowest probability of purchasing a house, while the other group exhibits the highest probability. The other group consists of those divorced, widowed and in a de facto relationship. In New Zealand, marital status is identified as married and never married, and the married group has higher home-ownership (SNZ, 2013). Therefore, the percentage of home-owners of married households was obviously higher than single households. Our result is consistent with the results of Feijten et al. (2003) and Hood (1999) who document that married households prefer to buy a house more than singles because married households have higher household wealth and prefer to be less mobile. Hood (1999) explains that married households have more accumulated household wealth to pay for their house and are less mobile to be home-owners in a permanent place.

The number of dependents is insignificant and positive related to house purchase. This implies that the increase in the number of dependents will increase the probability of a household to purchase their house. The result is consistent with the findings of Hood (1999) and Segal and Sullivan (1998) who find that households with children prefer to own a house more than households without children. Moreover, they also find that the rate of purchasing a house is the highest for households with two dependents.

The result also shows occupation is positive but statistically insignificant. According to Clapham (2005), employment is the major source of household income. A better

occupation implies a higher level of household income. Higher income makes it easier to accumulate wealth, thus, it improves the probability of purchasing a house. Further Clapham (2005) argues that a skilled worker has a higher probability of buying a house than unskilled workers. The most common occupation of unskilled workers is a labourer.

Education is insignificant but negatively related to the decision to purchase a house. The result contradicts our hypothesized sign. According to Table A.2, the rate of home-ownership for high school households is 82.1%, the undergraduate group is 84.8% and for postgraduate groups, it is 82.6%. Thus, the undergraduate group has the largest proportion of home-ownership. The study of Gyourko and Linneman (1997) supports this result whereby undergraduate households have a higher home-ownership than high school graduates.

The size of the house is positive and statistically significant at the 1% level. The result shows that as the size of the house increases there is a likelihood of an increase in house purchase. This implies that home-owners prefer a large size house more than a small size. Gerardi et al. (2010) found that the size of the house is relevant to family wealth. Higher income households prefer to purchase houses of a large size. Indeed, household income is positive with the proportion of home-ownership and model 3 also indicates a positive relationship between house purchase and higher income. The result is consistent with our hypothesis.

The size of the household is negative and statistically significant at 5% level. The result implies that there is a negative relationship between the size of the household

and house purchase. This is consistent with the results of Andrews and Sánchez (2011), and Quercia, et al (2003) in which size of the household has a downward effect on the rate of homeowners.

Table 4.9 presents the estimated results of house purchase post-earthquake. The model shows only four of the factors are significant at the 1% significance level. Compared with the result in model 3, gender is insignificant. Similarly, Table 4.8 shows three factors are statistically significant at the 5% level and two factors are at 1% level. The chi-squared test strongly rejects the hypothesis of no explanatory power.

Table 4.9 Estimated Logit Results of House Purchase Post-earthquake (Model 4)

Number of observations =401					
Log Likelihood =-138.84604					
Pseudo R-squared= 0.1711					
Chi Squared= 57.31					
Degree of freedom= 9					
Prob[ChiSqd> value] = 0.000					
Percentage of Right Predictions= 84.8%					
Mean of VIF=4.49					
Variables	Coefficient	Standard Error	P-value	Marginal effect	VIF
Income (High Range)	0.804**	0.362	0.026	0.088	5.11
Gender	0.200	0.331	0.546	0.019	1.96
Age (≥35)	2.263***	0.530	0.000	0.403	9.02
Marital Status (Married)	0.191	0.481	0.692	0.019	10.19
Number of Dependents (More than Two)	-0.281	0.434	0.517	-0.027	2.28
Occupation (Middle Professional)	0.734**	0.360	0.042	0.072	2.74
Education (Under graduation)	0.282	0.329	0.391	0.027	2.84
Size of house (More Than Four)	1.606***	0.365	0.000	0.210	4.56
Size of households (More than Three)	-1.099**	0.458	0.017	-0.135	1.70
, * denotes statistically significant at the 0.05 and 0.01 level of significance, respectively					

Source: Author's calculation based on the 2015 Survey

Table 4.9 shows that the gender is positive related to homeownership. This indicates that males have a higher probability to own a house. The research of Manrique and Ojah (2003), Allen (2002), and Brisson & Usher (2007) agree with the result. As well, marital status (married) is positive but insignificant. This implies that married households have a higher probability of owning a house. The result is supported by the Feijten et al.'s (2003) and Hood's (1997) studies in which married households prefer to purchase a house more than singles, married households are less mobile and have higher accumulated household wealth. The occupation is positive and statistically significant at 5% level. Courgeau and Lelièvre's (1992) find that better occupation will result in a higher probability to afford a house. The likelihood of buying house increases as the number of dependents increases. According to Table A.2, the largest proportion of number of dependents is 2. This is consistent with the research of Segal and Sullivan's (1998). They find that there is an increased trend in home-ownership with the increase in the number of children. The education coefficient is positive and statistically significant at the 1% level. This indicates that more highly educated households are more likely to buy a house. The study of Gyourko and Linneman (1997), Painter et al., (2001), and Andrews and Sánchez (2011) support our result that more highly educated households have better occupations and better incomes to afford their houses. However, the size of the household coefficient is negative and statistically significant at the 1% level but contradicts our hypothesized sign. The result of Quercia et al. (2003) is negative

between home-ownership and the number of households which supports our result. Based on the findings of Gerardi et al, (2010), the positive or negative relationship is decided by the proportion of dependents in a family. This is because the increase in adults will increase the household income so that the increase in family members will increase the probability of purchasing a house if the new member is a dependent.

Table 4.10 Test Results of Hypotheses 11 to 19

	Pre-earthquake	Post-earthquake
H11: The relationship between housing purchase and household income is positive.	√	√
H12: The relationship between housing purchase and gender is positive.	√	x
H13: The relationship between housing purchase and age is positive.	√	√
H14: The relationship between housing purchase and marital status is positive.	**x**	x
H15: The relationship between housing purchase and number of dependent children is positive.	x	x
H16: The relationship between housing purchase and occupation is positive.	x	√
H17: The relationship between housing purchase and education is positive.	**x**	x
H18: The relationship between housing purchase and size of houses is negative.	√	√
H19: The relationship between housing purchase and size of household is significant.	**x**	√

Note: √ (supported) and x (not supported)

Table 4.11 Marginal Effects of Pre-earthquake and Post-earthquake models

	Pre-earthquake		Post-earthquake	
Variables	Marginal effect	Ranking	Marginal effect	Ranking
Income	0.109	3	0.088	4
Gender	-0.072	6	0.019	9
Age	0.426	1	0.403	1
Marital Status	-0.055	7	0.019	8
Number of Dependents	0.076	5	-0.027	6
Occupation	0.049	8	0.072	5
Education	-0.029	9	0.027	7
Size of house	0.314	2	0.210	2
Size of household	-0.097	4	-0.135	3
Summary of absolute value	1.227		1.000	
Averaged absolute value	0.136		0.111	

Source: Author's calculation based on the 2015 Survey

According to the marginal effect variables in the pre-earthquake model (see Table 4.11), age is the most sensitive factor with the house purchase. A unit increase in age will result in a 42.6% probability that the household will purchase a house. Similarly, a unit increase in the size of the house will result in a 31.4% likelihood that the household will own a house. A unit increase in size of household shows a decrease of 9.7% on households buying a house, while a unit increase in income will result in a 10.9% probability that the household will purchase a house.

In the post-earthquake model, age also exhibit the highest marginal effect, where a unit increase in age will result in a 40.3% probability of an increase in home-ownership. Similarly, a unit increase in the size of the house will result in a 21% probability of an increase in home-ownership. A unit increase in income will result in an 8.8% probability of an increase in home-ownership, whereas a unit increase of size of household will lead a 13.5% probability of a reduction in a preference to own a

house.

Comparing the marginal effect ranking in the pre-earthquake and post-earthquake models in Table 4.11, age and size of house are ranked 1st and 2nd, respectively. The result indicates that the two factors are the most sensitive related to the house purchase pre- and post-earthquake. Minor changes have taken in income and size of household, income drops from 3rd to 4th and size of household ranks from 4th to 3rd. The sensitivity of gender with house purchase has decreased, which ranks from 6th to 9th. Moreover, marital status and number of dependents drop three ranks. This indicates a less sensitive relationship between the two factors and house purchase in the post-earthquake period. Conversely, occupation's ranking improves from 8th to 5rd, the obvious increase reflects a higher sensitivity between occupation and house purchase. Similarly, education also become more sensitive with house buying. The ranking of education rises from 9th to 7th. Those variables are less sensitive with house purchase in the post-earthquake period than in pre-earthquake period.

Compared with the absolute value in marginal effect in the pre-earthquake and post-earthquake periods, it is lower in post-earthquake period. Therefore, the relationship between the independent variables and dependent variables in the pre-earthquake period is more sensitive than in the post-earthquake period.

The study also calculates the means importance (based on the Likert scale) on the factors that determine the respondents' decision to purchase a house. Table 4.12 shows the mean values of the attributes that determine the respondents' decision to buy a house.

Table 4.12 Importance of Attributes in Determining Home Purchase (Home-owners Only)

Attribute Variable	Importance(Pre-earthquake)			Importance (Post-earthquake)		
	VI	Important	NAI	VI	Important	NAI
Availability of financing		√			√	
	Mean Values		2.5516	Mean Values		2.3111
Price of House	√				√	
	Mean Values		1.6129	Mean Values		2.0556
Getting married			√			√
	Mean Values		4.4839	Mean Values		3.9111
Investment			√		√	
	Mean Values		3.2129	Mean Values		2.5222
Quality of life		√			√	
	Mean Values		1.7903	Mean Values		2.2444
Job required			√		√	
	Mean Values		3.9548	Mean Values		3.2667
Location/Convenience		√			√	
	Mean Values		1.8226	Mean Values		2.2556
Raise children			√			√
	Mean Values		3.4677	Mean Values		3.6111
Prospect of increasing house price		√			√	
	Mean Values		3.1806	Mean Values		2.3333
Rebuilding house post-earthquake	N/A					√
				Mean Values		3.5667
NAI=Not at all important; VI=Very important						

Source: Author's calculation based on the 2015 Survey

According to Table 4.12, the most important factor that impacts the respondents' buying a house is price, followed by the quality of life and convenient location. The factors such as availability of financing, investment, raising children, marital status (married) and the prospect of an increasing house price have a moderate impact on the respondents' decision to purchase a house. Comparing the results between the pre-earthquake and post-earthquake periods, factors such as the price of the house, quality of life and location and convenience of the house become more neutral (close

to 3) in the post-earthquake period. The other factors such as rebuilding a house in the post-earthquake period exhibits a mean score of 3.5667. This indicates that the factor does not have an impact on the house purchasing decision. Moreover, Table 4.12 shows the expectation of an increase in future house prices from 3.1806 to 2.3333. The prospect of an increase in house prices in the future becomes more important in decision making for respondents in the post-earthquake period. After the earthquake, buying a house is treated as an investment more than in the pre-earthquake period.

Table 4.13 Importance of Attributes in Determining Home Purchase (Non-home-owners Only)

Attribute Variable	Importance(Pre-earthquake)			Importance (Post-earthquake)		
	VI	Important	NAI	VI	Important	NAI
Don't want to buy		√			√	
	Mean Values		3.0968	Mean Values		2.3167
High housing price		√			√	
	Mean Values		2.6452	Mean Values		2.7833
High down payment		√				√
	Mean Values		3.2258	Mean Values		3.6167
Lack of housing choice where I want to live			√		√	
	Mean Values		4.2581	Mean Values		3.1388
High housing price where I want to live			√			√
	Mean Values		3.6774	Mean Values		3.4167
Cannot qualify for a loan			√			√
	Mean Values		4.3226	Mean Values		3.6
Cheaper to rent		√			√	
	Mean Values		2.7742	Mean Values		2.9667
Having other loan commitments			√			√
	Mean Values		4.3548	Mean Values		4.4667
Duration of living in Christchurch			√			√
	Mean Values		3.871	Mean Values		3.85
Afraid of future earthquake	N/A					√
				Mean Values		4.1
Difficult to get insurance	N/A					√
				Mean Values		4.1333
NAI=Not at all important; VI=Very important						

Source: Author's calculation based on the 2015 Survey

Table 4.13 shows that high housing price and being cheaper to rent have relatively important effects on the respondents' decision to not be a homeowner in the pre-earthquake period. The other factors do not show significant impacts from the table. Compared with the results of the pre-earthquake model, the factors of lack of housing choice and qualification for a loan are more constraining on non-homeowners' decision to purchase a house post-earthquake. The increase in the variable "do not want to buy" shows that non-homeowners are more unwilling to be home-owners in the post-earthquake period. The lack of housing choice has a greater impact on home-ownership after the earthquake than in the pre-earthquake period. The earthquake has reduced the living resources for households' choices. However, considering the impact of the earthquake, with a mean score of 4.1, the factors such as being afraid of future earthquakes and finding it difficult to get insurance are not important for non-homeowners in the house purchasing decision.

In summary, the result of objective three shows that the earthquakes did impact the respondents' decision to purchase a house. The result identifies some socio-economic factors such as household income, age, occupation and size of the house which impact the respondents' decision to purchase a house. Further factors, such as house price, quality of life and house location also affect the respondents' house purchase decision.

4.4 Summary

Chapter Four presented the descriptive statistics of the surveyed respondents. The

descriptive statistics provided the overview of the housing market in the post-earthquake period. The empirical results of the four models used to answer the second and third research objectives via the logit regression models were discussed. The chapter also compared the housing situation between the pre-earthquake and post-earthquake periods. The following chapter presents the conclusions, including the results of the research findings, limitations and recommendations for future research.

Chapter 5

Conclusion

5.0 Introduction

Chapter Five summarizes the research, reviews the findings, and concludes the results based on the discussions in Chapter Four. The limitations of the research and recommendations for future research are also discussed.

5.1 Overview and Summary

The rate of home-ownership is relatively high in New Zealand. In 2011, the earthquake destroyed many houses and caused many households to lose their homes in Christchurch After that, the government of New Zealand took measures to reconstruct Christchurch. The new policies and households' attitudes toward mortgages and the housing market will influence mortgage borrowing behavior and home-ownership. Thus, the status of Christchurch housing and the mortgage market post-earthquake is relatively different from the market before the earthquake.

The purpose of this study is to investigate the changes in the housing market in Christchurch post-earthquake and identify the factors that influence the mortgage borrowing and house purchases. There are three objectives in the research:

- ✧ To provide an overview of the housing market in pre-and post-earthquake in Christchurch.
- ✧ To identify post-earthquake factors based on socio-economic factors that affect households' mortgage loans in Christchurch.
- ✧ To determine the socio-economic factors affecting the consumers' housing

purchase decisions post-earthquake in Christchurch.

5.2 Conclusions Pertaining to Research Objective One

Research Objective One: To provide an overview of the housing market in pre-and post-earthquake in Christchurch.

According to the survey, the rate of home-ownership exhibits a minor increase of approximately 1.7%. Similarly, the percentage of homeowners using mortgage loans also increased by 16.2%. On the other hand, the rate of potential homeowners in non-homeowners was about 33.9%.

In terms of the homeowners in the pre-earthquake period, a large proportion (84.8%) had their houses damaged by the earthquake and most of them received help from insurance to cover their repair costs. After the earthquake, there were 22.4% households who bought houses, including new home buyers, homeowners who changed their house, and homeowners who bought a new house and held on to the old house. In terms of house buyers during the post-earthquake period, 67.8% of the households used mortgages and 45.9% of them already had a mortgage before the earthquake. Furthermore, there were 21% households in the pre-earthquake period who changed their home-ownership after the earthquake. 78 respondents (21% of the households), included four groups: 24.4% who did not hold on to their old house while buying another house, 41% of them who bought a new house while holding the old house, 9.0% of them who lost their house without buying a new house at the time of the survey and the remainder were new homeowners. There were 90 respondents

who bought a house after the earthquake including 12 new migrants. Finally, the rate of new dwelling buyers in the post-earthquake period was 4% higher than in the pre-earthquake period. In terms of mortgage borrowing, there was a higher rate of mortgage take-up and a higher interest rate repayment post-earthquake.

5.3 Conclusions Pertaining to Research Objective Two

Research Objective Two: To identify post-earthquake factors based on socio-economic factors that affect households' mortgage loans in Christchurch.

The result of the logit analysis shows that gender, marital status, educational attainment, occupation, household income and size of household statistically significantly affect the decision of the respondents to use mortgages to purchase houses in the pre-earthquake period. The logit regression also shows that only education, household income and number of dependents are statistically significant factors affecting households' choice on mortgage borrowing in the post-earthquake period. These results are supported by researchs such as those of Black et al. (1978), Robinson (2002), Hartarska and Gonzalez-Vega (2006), Munnell et al. (1996), Reichert (1990), Chien and DeVaney (2001), Linneman and Wachter (1989), Archer et al. (1996), Ortalo-Magne and Rady (2006), Chambers et al. (2009), Elliehausen and Staten (2004), and Gerardi et al. (2010).

Three factors such as gender, marital status and educational attainment exhibit negative impacts on mortgage borrowing. Hartarska and Gonzalez-Vega's (2006) study shows that married households have a higher probability of accessing a

mortgage than single households. The data of Table A.2 shows that the proportion of homeowners in married households is higher than in non-married households. The research of Hood (1995) indicates that married households have higher household wealth than non-married households so that they are more likely to borrow to buy a house. Similarly, the educational attainment coefficient exhibits a sign opposite to the previous findings. Munnell et al. (1996) believe that a higher level of education will result in a higher probability of mortgage borrowing. The survey data shows that respondents with an undergraduate degree had the largest proportion of mortgage purchase and the result is consistent with the findings of Munnell et al. (1996). The possible reason might be the high mortgage borrowing rate in the small sample group (6 respondents) with primary school education. The group borrowed to buy their houses (all the homeowners in the group were borrowers). However, the results of other groups are consistent with the study of Munnell et al. (1996). The undergraduate group has a higher rate of borrowing than the high school graduate group. The gender coefficient contradicts the research findings of Ojo and Ighalo (2008) and Robinson (2002). However, Law and Meehan's (2013) study shows a higher home-ownership for females in New Zealand. The authors' study shows that females have a higher likelihood to own a house in New Zealand. According to a report by Statistics New Zealand (2013), females have a higher rate of employment than males in New Zealand. Higher employment rates mean higher household incomes which make for a better tolerance for mortgage borrowing.

In the post-earthquake model, income, occupation and size of household are

statistically significant in pre-earthquake and post-earthquake models. This means that the three factors could be treated as the most important socio-economic factors impacting a household's decision on a mortgage purchase.

Finally, the mortgage interest payment rate post-earthquake is higher than in the pre-earthquake period; however, the rate of mortgage purchase for homeowners increased after the earthquake. Thus, the increased mortgage interest payment rate does not influence the mortgage purchase of households after the earthquake.

5.4 Conclusions Pertaining to Research Objective Three

Research Objective Three: To determine the socio-economic factors affecting the consumers' housing purchase decisions post-earthquake in Christchurch.

The logit analysis indicates a small change on the socio-economic factors affecting the decisions of consumers on housing purchases between the pre-earthquake and post-earthquake model. The results of the logit pre-earthquake model show the socio-economic factors such as income, gender, age, size of house and size of household are statistically significant for housing purchase decisions. Similarly, the post-earthquake model shows income, age, occupation, size of house and size of household are statistically significant in housing purchase decisions. These results are supported by the findings of Bourassa (1995), Painter et al. (2001), Green et al. (1996), Feijten et al. (2003), Manrique and Ojah (2003), Clapham (2005) and Campbell and Cocco (2007).

The coefficients of income, age, number of dependents, occupation and size of house

exhibit a positive relationship with house purchase in both the pre-earthquake and post-earthquake models. Painter et al. (2001) find that lower household income is related to a lower home-ownership. Similarly, Green et al. (1996) find home-ownership increases as the age of the household head increases. Mulder and Billari (2010) believe that raising children will encourage household to have a better living environment as well as to own a house. Clapham's (2005) study finds that there is a close relationship between occupation and family wealth which is positive with the rate of home-ownership. There is also a close relationship between the size of the house and households' affordability, as in this study, the size of the house exhibits a positive relationship with home-ownership.

Furthermore, the house price in the post-earthquake model has increased at the time of the survey while the rate of home-owners has also increased. In the answers of homeowners, after the earthquake, they treated the house price as less important than in the pre-earthquake period. Similarly, the rate of home-ownership is higher post-earthquake than pre-earthquake. Therefore, there is no significant evidence to show the house price is an important factor affecting house purchase. The survey also includes questions about the impact of the government policy on residents. Based on the survey answers of the respondents, the households did not think that government policies had a direct impact on their house purchase behavior.

5.5 Contribution

The research makes several contributions to the mortgage market and house market post-earthquake in Christchurch. Firstly, the overview of the housing market in the

post-earthquake period exhibits the changes in home-ownership and mortgage borrowing after the earthquakes. This indicates the impacts of the earthquake on the homeowners' houses and the changes of households' home-ownership as well as their mortgage behavior. The evidence shows that the reconstruction of Christchurch city has not been completed. It provides a better understanding of the mortgage and house markets of Christchurch city post-earthquake.

Moreover, the result of the study shows the important factors influencing households' choice of a mortgage and home-ownership. The factors determining the decision to purchase a house are different from the factors impacting them to borrow a mortgage to pay for the house. The other factors show that the earthquake in Christchurch influenced the households to borrow mortgages, but did not have significant effects on factors affecting homebuyers' behavior. Therefore, the result indicates that the factors that impact the borrowing behaviors are different in the pre-earthquake and post-earthquake periods. For instance, the surveyed households treated the number of dependents as an important factor that impacts mortgage borrowing in the post-earthquake period, and age and size of the household are no longer as important as in the pre-earthquake period. Thus, the results of this study help financial companies to understand a household's requirement regarding a mortgage and take measures to assess their post-earthquake house purchase to reduce the default risk.

5.6 Limitations and Recommendations for Future Research

The questionnaires of the study were sent out by mailing. Therefore, the feedbacks critically depended on the willingness of respondents. This may have caused some

bias on some social factors, such as gender, age, and education. This is especially so on age, as a large proportion of the respondents are older people. The results of the survey suggest that older people are more willing to answer a questionnaire than younger people. However, it is hard to avoid bias by sending out questionnaires, because the method of sorting samples is limited by the information about the households and respondents with the freedom to choose how to answer the questionnaires. Therefore, if there are enough time and detailed information, a door to door survey is more suitable and could reduce bias on this factor.

Some other factors which may have effects on our models have not been taken into consideration, such as the house location and race of households. For example, the house location will decide where the households will live, the facilities around the house (such as school, hospital and shopping malls), and their neighbors. Therefore, house location will impact on a household's decision to purchase a house and whether they can find a house to meet their need. Also, the race of households may impact on their attitude on house purchase and access to a mortgage.

Finally, some factors related to the earthquake could not be defined clearly in the study, such as house prices and government policies. This is because the house price is affected by a number of factors, such as interest rate, house prices of other regions, and government policy. Moreover, the two logit models in the study include both the data of homeowners and non-homeowners. Therefore, the reason house price could not be treated as one of the dependent variables is that non-homeowners do not own a house and did not answer the question on "owning a house". For government policies,

this is a macro-index and it is difficult to obtain feedback on policy-related questions from respondents. Therefore, this study cannot discuss the impact of government policies on specific respondents.

Christchurch is in an earthquake-prone zone and there are still earthquakes in the area. The reconstruction of the city is anticipated to be completed after 2020. Future research can attempt to test whether the new city would be more attractive for migrants and how much the house market and mortgage market will be influenced by the reconstruction. Thus, a continuous observation could be taken in Christchurch to test whether the mortgage borrowing behavior and housing purchase behaviors will be influenced by the reconstruction of the city. Moreover, if the result is yes, how does the reconstruction impact their behaviors?

On the other hand, our study could be a reference on policy releasing (about housing market) after a disaster, especially an earthquake. The study indicates the relationship between socio-economic factors and house market. Therefore, if the government has relevant information about the socio-economic factors (such as census) on households, the new policy related to the earthquake could consider the changes of significant on those factors. For example, the government could provide more jobs for workers in infrastructures development, such as the rebuilding of the commercial center and public transport. The development of infrastructures will increase the demand for labours, which in turn will stimulate other spending such as food, house, and other services. Therefore, demand for those services will provide more jobs for the households. Similarly, the government could improve household income to stimulate

the demand on houses, such as improving minimum wage of workers.

5.7 Conclusion

The objective of the research is to investigate the residential mortgage and house markets in Christchurch, which had been affected by the earthquakes. The research findings reveal that there were changes caused by the earthquakes, in terms of the mortgage market and house market. After four years of reconstruction in Christchurch, the rate of homeowners has increased. Although the factors affecting households to purchase a house exhibit minor changes, the factors affecting households' decisions on mortgage purchase exhibit significant changes (see Table 4.10).

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Appendix A : Tables

Table A.1 Profile of Surveyed Respondents

Variables	Groups	N	Frequency	Percentage
Lived in Christchurch post-earthquake	left and return	Valid	13	3.2%
	After		30	7.5%
	before		358	89.3%
	Total		401	100.0%
Homeownership pre-Earthquake	N/A	Valid	30	7.5%
	Yes		310	77.3%
	No		61	15.2%
	Total		401	100.0%
Gender	female	Valid	217	54.1%
	male		184	45.9%
	Total		401	100.0%
Age	<=25	Valid	2	0.5%
	25-34		21	5.2%
	35-44		37	9.2%
	45-54		80	20.0%
	55-64		117	29.2%
	>=65		144	35.9%
	Total		401	100.0%
Marital Status	Single	Valid	40	10.0%
	Divorced		53	13.2%
	Widowed		29	7.2%
	De facto		15	3.7%
	Married		264	65.8%
	Total		401	100.0%
Education	Primary	Valid	6	1.5%
	High		140	34.9%
	Undergraduate		159	39.7%
	Postgraduate		96	23.9%
	Total		401	100.0%
Occupation	Manager	Valid	36	9.0%
	Professional		75	18.7%
	Technician		28	7.0%
	Community		11	2.7%
	Clerical		31	7.7%
	Sales		23	5.7%
	Machinery Operator		10	2.5%
	Labourer		15	3.7%

	Student		4	1.0%
	Unemployment		12	3.0%
	Retired		156	38.9%
	Total		401	100.0%
Annual Income	<=$20000	Valid	37	9.2%
	$2001-35000		64	16.0%
	$35001-50000		49	12.2%
	$50001-65000		72	18.0%
	$65001-80000		52	13.0%
	80001-95000		51	12.7%
	>95000		76	19.0%
	Total		401	100.0%
Duration of Working	<1	Valid	7	1.7%
	1-5		19	4.7%
	6-11		35	8.7%
	>12		340	84.8%
	Total		401	100.0%
Family Composition	1 Adult	Valid	98	24.4%
	Single parent with children		27	6.7%
	Couple no child		142	35.4%
	Couple with Children		116	28.9%
	Immediate and extended family members		13	3.2%
	Others		5	1.2%
	Total		401	100.0%
Number of Family Members	1	Valid	83	20.7%
	2		166	41.4%
	3		77	19.2%
	>=4		75	18.7%
	Total		401	100.0%
Number of Dependents	0	Valid	265	66.1%
	1-2		111	27.7%
	3-4		25	6.2%
	Total		401	100.0%

Source: Author's calculation based on the 2015 Survey

Table A.2 Descriptive Statistics of the Respondents in the Pre-Earthquake Period (Homeowner versus Non-homeowners)

Variables	Groups	N	Homeowners		Non-homeowners	
			Frequency	Percentage	Frequency	Percentage
Gender	female	Valid	174	56.1%	28	45.9%
	male		136	43.9%	33	54.1%
	Total		310	100.0%	61	100.0%
Age	<=25	Valid	6	1.9%	N/A	N/A
	25-34		6	1.9%	9	14.8%
	35-44		15	4.8%	15	24.6%
	45-54		65	21.0%	7	11.5%
	55-64		89	28.7%	22	36.1%
	>=65		135	43.5%	8	13.1%
	Total		310	100.0%	61	100.0%
Marital Status	Single	Valid	29	9.4%	7	11.5%
	Divorced		41	13.2%	10	16.4%
	Widowed		27	8.7%	2	3.3%
	De facto		14	4.5%	1	1.6%
	Married		199	64.2%	41	67.2%
	Total		310	100.0%	61	100.0%
Education	Primary	Valid	6	1.9%	N/A	N/A
	High		110	35.5%	24	39.3%
	Undergraduate		123	39.7%	22	36.1%
	Postgraduate		71	22.9%	15	24.6%
	Total		310	100.0%	61	100.0%
Occupation	Manager	Valid	26	8.4%	5	8.2%
	Professional		68	21.9%	5	8.2%
	Technician		16	5.2%	4	6.6%
	Community		7	2.3%	3	4.9%
	Clerical		28	9.0%	3	4.9%
	Sales		13	4.2%	9	14.8%
	Machinery Operator		9	2.9%	1	1.6%
	Laborer		6	1.9%	8	13.1%
	Unemployment		7	2.3%	4	6.6%
	Retired		130	41.9%	19	31.1%
	Total		310	100.0%	61	100.0%
Annual Income	<=$20000	Valid	20	6.5%	12	19.7%
	$2001-35000		46	14.8%	12	19.7%
	$35001-50000		38	12.3%	7	11.5%

	$50001-65000		60	19.4%	11	18.0%
	$65001-80000		44	14.2%	5	8.2%
	80001-95000		38	12.3%	11	18.0%
	>95000		64	20.6%	3	4.9%
	Total		310	100.0%	61	100.0%
Duration of Working	<1	Valid	2	0.6%	1	1.6%
	1-5		10	3.2%	4	6.6%
	6-11		18	5.8%	11	18.0%
	>12		280	90.3%	45	73.8%
	Total		310	100.0%	61	100.0%
Family Composition	1 Adult	Valid	75	24.2%	19	31.1%
	Single parent with children		23	7.4%	4	6.6%
	Couple no child		122	39.4%	10	16.4%
	Couple with Children		77	24.8%	25	41.0%
	Immediate and extended family members		8	2.6%	3	4.9%
	Others		5	1.6%	N/A	N/A
	Total		310	100.0%	61	100.0%
Number of Family Members	1	Valid	64	20.6%	17	27.9%
	2		141	45.5%	16	26.2%
	3		54	17.4%	16	26.2%
	>=4		51	16.5%	12	19.7%
	Total		310	100.0%	61	100.0%
Number of Dependents	0	Valid	219	70.6%	29	47.5%
	1-2		69	22.3%	31	50.8%
	3-4		22	7.1%	1	1.6%
	Total		310	100.0%	61	100.0%

Source: Author's calculation based on the 2015 Survey

Table A.3 Descriptive Statistics of the Respondents in the Post-Earthquake Period (Homeowner versus Non-homeowners)

Variables	Groups	N	Homeowners		Non-homeowners	
			Frequency	Percentage	Frequency	Percentage
Gender	female	Valid	180	52.6%	37	62.7%
	male		162	47.4%	22	37.3%
	Total		342	100.0%	59	100.0%
Age	<=25	Valid	N/A	N/A	2	3.4%
	25-34		13	3.8%	8	13.6%
	35-44		30	8.8%	7	11.9%
	45-54		69	20.2%	11	18.6%
	55-64		94	27.5%	23	39.0%
	>=65		136	39.8%	8	13.6%
	Total		342	100.0%	59	100.0%
Marital Status	Single	Valid	29	8.5%	11	18.6%
	Divorced		40	11.7%	13	22.0%
	Widowed		27	7.9%	2	3.4%
	De facto		14	4.1%	1	1.7%
	Married		232	67.8%	32	54.2%
	Total		342	100.0%	59	100.0%
Education	Primary	Valid	5	1.5%	1	1.7%
	High		115	33.6%	25	42.4%
	Undergraduate		137	40.1%	22	37.3%
	Postgraduate		85	24.9%	11	18.6%
	Total		342	100.0%	59	100.0%
Occupation	Manager	Valid	34	9.9%	2	3.4%
	Professional		72	21.1%	3	5.1%
	Technician		23	6.7%	5	8.5%
	Community		11	3.2%	N/A	N/A
	Clerical		29	8.5%	2	3.4%
	Sales		17	5.0%	6	10.2%
	Machinery Operator		9	2.6%	1	1.7%
	Labourer		7	2.0%	8	13.6%
	Student		N/A	N/A	4	6.8%
	Unemployment		7	2.0%	5	8.5%
	Retired		133	38.9%	23	39.0%
	Total		342	100.0%	59	100.0%
Annual Income	<=$20000	Valid	22	6.4%	15	25.4%
	$2001-35000		51	14.9%	13	22.0%

	$35001-50000		35	10.2%	14	23.7%
	$50001-65000		66	19.3%	6	10.2%
	$65001-80000		49	14.3%	3	5.1%
	80001-95000		45	13.2%	6	10.2%
	>95000		74	21.6%	2	3.4%
	Total		342	100.0%	59	100.0%
Duration of Working	<1	Valid	2	0.6%	5	8.5%
	1-5		14	4.1%	5	8.5%
	6-11		30	8.8%	5	8.5%
	>12		296	86.5%	44	74.6%
	Total		342	100.0%	59	100.0%
Family Composition	1 Adult	Valid	77	22.5%	21	35.6%
	Single parent with children		19	5.6%	8	13.6%
	Couple no child		128	37.4%	14	23.7%
	Couple with Children		104	30.4%	12	20.3%
	Immediate and extended family members		9	2.6%	4	6.8%
	Others		5	1.5%	N/A	N/A
	Total		342	100.0%	59	100.0%
Number of Family Members	1	Valid	66	19.3%	17	28.8%
	2		145	42.4%	21	35.6%
	3		70	20.5%	7	11.9%
	>=4		61	17.8%	14	23.7%
	Total		342	100.0%	59	100.0%
Number of Dependents	0	Valid	226	66.1%	39	66.1%
	1-2		91	26.6%	20	33.9%
	3-4		25	7.3%	N/A	N/A
	Total		342	100.0%	59	100.0%

Source: Author's calculation based on the 2015 Survey

Table A.4 House Conditions Pre-Earthquake (Homeowners)

Variables	Groups	Valid	Frequency	Percentage
Repair Choice	Cash	N	70	26.6%
	Managed Repair Option		160	60.8%
	Both		6	2.3%
	None of the Above		27	10.3%
House Status	Minor repair	N	170	64.6%
	Major repair		79	30.0%
	Destroyed		14	5.3%
Living Condition	Rent	N	75	28.5%
	With Relative/friends		16	6.1%
	Buy		16	6.1%
	Still living		156	59.3%
Insurance payment	Fully	N	159	60.5%
	Partially		35	13.3%
	No		69	26.2%
Additional Loan	Further repair	N	5	1.9%
	New house		7	2.7%
	No		251	95.4%
Total			263	100.0%

Source: Author's calculation based on the 2015 Survey

Table A.5 Correlation Matrix of Model One (Pre-Earthquake Period)

	Constant	Gender	Age	Marital	Education	Occupation	Income	No Family	Dependents
Constant	1.000	-.109	-.836	-.335	-.105	-.152	-.099	-.154	-.264
Gender	-.109	1.000	.068	-.057	.050	-.063	-.219	-.020	-.072
Age	-.836	.068	1.000	-.099	.020	.063	-.010	.319	.144
Marital	-.335	-.057	-.099	1.000	-.081	.174	-.196	-.402	.108
Education	-.105	.050	.020	-.081	1.000	-.164	-.172	-.073	.014
Occupation	-.152	-.063	.063	.174	-.164	1.000	-.187	.000	-.043
Income	-.099	-.219	-.010	-.196	-.172	-.187	1.000	-.075	-.005
No Family	-.217	.028	.266	-.161	-.138	-.185	.039	1.000	-.519
Dependents	.109	-.115	-.116	-.035	.081	-.061	.033	-.519	1.000

Source: Author's calculation based on the 2015 Survey

Table A.6 Correlation Matrix of Model One (Post-Earthquake Period)

	Constant	Gender	Age	Marital	Education	Occupation	Income	No Family	Dependents
Constant	1.000	-.119	-.755	-.324	-.126	-.179	-.179	1.000	-.119
Gender	-.119	1.000	.068	-.079	.043	-.064	-.201	-.119	1.000
Age	-.755	.068	1.000	-.211	.029	.056	.015	-.755	.068
Marital	-.324	-.079	-.211	1.000	-.129	.181	-.128	-.324	-.079
Education	-.126	.043	.029	-.129	1.000	-.181	-.128	-.126	.043
Occupation	-.179	-.064	.056	.181	-.181	1.000	-.147	-.179	-.064
Income	-.179	-.201	.015	-.128	-.128	-.147	1.000	-.179	-.201
NO.FAMILY	-.308	.045	.360	-.131	-.097	-.119	-.014	-.308	.045
Dependents	.131	-.095	-.138	-.031	.058	-.055	.015	.131	-.095

Source: Author's calculation based on the 2015 Survey

Table A.7 Correlation Matrix of Model Two (Pre-Earthquake Period)

	Constant	Income	Gender	Age	Marital	Dependents	Occupation	Education	Bedroom	No. Family
Constant	1.000	-.009	-.163	-.743	-.383	.112	.124	-.389	-.284	-.135
Income	-.009	1.000	-.256	.044	-.283	.030	.023	-.022	.050	-.057
Gender	-.163	-.256	1.000	.033	.020	-.058	-.037	.011	-.035	-.110
Age	-.743	.044	.033	1.000	-.173	-.132	-.102	.078	.112	.389
Marital	-.383	-.283	.020	-.173	1.000	.005	-.073	.037	-.061	-.339
Dependents	.112	.030	-.058	-.132	.005	1.000	-.038	.059	-.062	-.576
Occupation	.124	.023	-.037	-.102	-.073	-.038	1.000	-.169	.175	.009
Education	-.232	-.262	.114	.021	.089	.041	-.209	1.000	-.038	-.047
Bedroom	-.160	-.029	-.092	.188	-.160	-.107	-.014	-.038	1.000	-.302
No. Family	-.261	-.091	-.036	.323	-.077	-.149	-.163	-.047	-.302	1.000

Source: Author's calculation based on the 2015 Survey

Table A.8 Correlation Matrix of Model Two (Post-Earthquake Period)

	Constant	Income	Gender	Age	Marital	Dependents	Occupation	Education	Bedroom	No. Family
Constant	1.000	-.024	-.173	-.711	-.314	.042	-.319	-.422	-.342	-.071
Income	-.024	1.000	-.206	.003	-.136	-.099	-.259	-.046	.086	-.168
Gender	-.173	-.206	1.000	.042	.014	-.127	.019	.024	.034	-.084
Age	-.711	.003	.042	1.000	-.248	.112	.187	.134	.100	.331
Marital	-.314	-.136	.014	-.248	1.000	-.187	.058	-.029	-.072	-.295
Dependents	.042	-.099	-.127	.112	-.187	1.000	-.245	-.039	.092	-.455
Occupation	-.319	-.259	.019	.187	.058	-.245	1.000	-.096	.192	-.029
Education	-.260	-.116	.103	.083	-.016	-.149	-.013	1.000	.036	-.002
Bedroom	-.332	-.132	-.013	.276	-.165	-.005	.142	.036	1.000	-.447
No. Family	.120	.011	.029	-.102	-.002	-.428	-.095	-.002	-.447	1.000

Source: Author's calculation based on the 2015 Survey

Appendix B : Survey Questionnaire

Cover Letter

Dear Sir/Madam,

You are invited to participate in a survey that constitutes part of my Master of Commerce and Management thesis at Lincoln University, New Zealand. This is a part of my research project entitled "An Empirical Analysis of the Christchurch Residential Mortgage Market: Post Earthquake". The purpose of this research is to investigate factors that impact consumers' mortgage behavior post-earthquake.

This research is completely voluntary in nature and you are free to decide not to participate at any time during the process of completing the questionnaire and without prejudice, including withdrawal of any information you have provided. However, if you complete the questionnaire and return it to me, it will be understood that you are 18 years of age or older and have consented to participate in this survey and consent to publication of the results of this research with the understanding the anonymity will be preserved.

Your participation is of great assistance to this research. This survey will take maximum 40 minutes to complete. I would be grateful if you would complete the questionnaire and return it to me once you have finished. I will return to collect the completed survey.

Complete anonymity is assured in this survey, as the questionnaire is anonymous. No questions are asked which would identify you as an individual. All responses will be aggregated for analysis only, and no personal details will be reported in the thesis or any resulting publications.

If you have any question about this survey, feel free to contact me on 021 08212661 or by email at Yanzhen.Rao@lincolnuni.ac.nz. You can also contact my supervisors Dr. Christopher Gan and Dr. Baiding Hu. Dr. Christopher Gan can be contacted at (03) 325811 (ext. 8155) or Christopher.Gan@lincoln.ac.nz; and Dr. Baiding Hu can be contacted at (03) 3252811 (ext. 8069) or Baiding.Hu@lincoln.ac.nz. This project has been reviewed and approved by the Lincoln University Human Ethics Committee. Thank you for your kind co-operation and assistance.

Yours sincerely,

Yanzhen Rao

Master student of Commerce and Management

Research Supervisors:

Dr. Christopher Gan
Professor
Faculty of Commerce
DAEF
Lincoln University

Dr. Baiding Hu
Senior Lecturer
Faculty of Commerce
DAEF
Lincoln University

Survey Questionnaire

Code No. _____

An Empirical Analysis of Christchurch Residential Mortgage Market: Post Earthquake

Instructions: For each question with boxes provided, please tick your answer(s); otherwise, please follow the instructions given to answer the questions. Only summary measures and conclusions from this survey will be reported. **There are 6 sections, you only need to answer the relevant parts, please follow the guidelines.** Your participation is voluntary and all of your answers will be kept confidential.

Section 1. General Information (for ALL respondents)

1-1. What type of housing do you currently live in?

☐ a. A free standing house

☐ b. An apartment

☐ c. A home unit

☐ d. A state house

☐ e. Other(s) please specify _____

1-2. How long have you been living in your current house[9]? (please state)

_____years.

1-3. How old is your current house? (please state)

_____years.

1-4. How many bedrooms are in your current house?

☐ a. One bedroom

☐ b. Two bedrooms

☐ c. Three bedrooms

☐ d. Four bedrooms

☐ e. Five bedrooms

☐ f. Six or above

1-5. Did you change your accommodation post-earthquake?

☐ a. Yes

☐ b. No

1-6. Where is your current house located?

☐ a. East Christchurch

☐ b. South Christchurch

☐ c. West Christchurch

☐ d. North Christchurch

☐ e. Central Christchurch

1-7. Which of the following zone is your home located?

☐ a. School zone

[9] House in the questionnaire includes unit and apartment

☐ b. Commercial zone (near to mall)

☐ c. Industrial zone (near to factory)

☐ d. Rural area

☐ e. Urban area

☐ f. I don't know

☐ g. Other(s) please specify_____

1-8. Which level of TC (Technical Category) does your home belong to?

☐ a. TC level 1 (Grey)

☐ b. TC level 2 (Yellow)

☐ c. TC level 3 (Blue)

☐ d. I don't know

1-9. When did you move to Christchurch?

☐ a. Left after earthquake but returned recently

☐ b. After earthquake (Please go to **Question 1-11**)

☐ c. Before earthquake (Please go to **Question 1-11**)

1-10. What was the main reason for you to return to Christchurch post-earthquake?

☐ a. Left temporary due to earthquake

☐ b. House damaged by earthquake

☐ c. Return for work/study

☐ d. Attracted by reconstruction of Christchurch (such as more working opportunities)

☐ e. Because of friends/relatives

☐ f. Other(s) please specify_____

1-11. How long have you been living in Christchurch post-earthquake?

☐ a. Less than 1 year

☐ b. 1– 4 years

☐ c. More than 4 years

1-12. Why did you choose to stay in Christchurch post-earthquake?

☐ a. Study

☐ b. Work

☐ c. Short-term Living

☐ d. Long-term living

☐ e. Born/raise here

☐ f. Because of relatives/friends

☐ g. Have always lived here

☐ h. Other(s) please specify_____

1-13. Have you been turned down for any type of loan before?

☐ a. Yes

☐ b. No

1-14. What was/were the reason(s) given by the lender for turning down your loan application? (You can choose more than one reason)

☐ a. Insufficient income/assets

☐ b. Unpaid previous loan(s) (bad credit record)

☐ c. Have no collateral

☐ d. Age

☐ e. Gender

☐ f. Other(s) please specify_____

1-15. If you moved to Christchurch pre-earthquake, please go to **Question 1-16.** If NO, do you own a home either outright or have a mortgage post-earthquake?

☐ a. Yes (Please go to **Section 4**)

☐ b. No (Please go to **Section 5**)

1-16. Did you own a home either outright or have a mortgage pre-earthquake?

☐ a. Yes (Please go to **Section 2**)

☐ b. No (Please go to **Section 3**)

Section 2: Homeowners Information Pre-Earthquake

2-1. How did you finance your home loan? (You can tick more than one)

☐ a. Borrowed from friends/relatives

☐ b. From savings

☐ c. Borrowed from commercial banks

☐ d. Borrowed from mortgage companies

☐ e. Other(s) please specify _____

2-2. What was the market value of your home pre-earthquake?

☐ a. Less than NZ$ 200,000

☐ b. NZ$ 200,001 – 400,000

☐ c. NZ$ 400,001 – 600,000

☐ d. NZ$ 600,001 – 800,000

☐ e. NZ$ 800,001 or above

2-3. Where was your house located pre-earthquake?

☐ a. East Christchurch

☐ b. South Christchurch

☐ c. West Christchurch

☐ d. North Christchurch

☐ e. Central Christchurch

2-4. In which of the following zones was your home located pre-earthquake?

☐ a. School zone

☐ b. Commercial zone (near to mall)

☐ c. Industrial zone (near to factory)

☐ d. Rural area

☐ e. Urban area

☐ f. I don't know

☐ g. Other(s) please specify_____

2-5. Has your house been damaged by the earthquake?

☐ a. Yes

☐ b. No (please go to **Question 2-11**)

2-6. If YES, which response did you take to repair your house?

☐ a. Cash

☐ b. Managed repair option

☐ c. None of above

2-7. What was the status of your house after the earthquake?

☐ a. Needs minor repair (Live in the house during repair)

☐ b. Needs major repair (Move out of the house during repair)

☐ c. Has to be destroyed totally (Impossible for living)

☐ d. Other(s) please specify _____

2-8. If your house is under repair/ reconstruction, where do you live?

☐ a. Renting a house

☐ b. Living with relatives/ friends

☐ c. Buying another house

☐ d. Still living in the house while repairing

2-9. If your house was damaged by the earthquake, did you receive any payment from your insurance?

☐ a. Fully covered repair fee

☐ b. Partially covered

☐ c. None

2-10. Did you take any additional loans post-earthquake? (You can tick more than one option.)

☐ a. Yes, for further repair

☐ b. Yes, purchased a new house with insurance pay-out

☐ c. No

2-11. How important are the following factors in determining your decision to purchase your home? Please CIRCLE (1-6) the degree of importance for each of the factors (where 1 indicates very important and 5 indicates not important at all, 6 indicates that you don't know).

	Very Important		Neutral		Not at all Important	Don't Know
a. Availability of financing	1	2	3	4	5	6
b. Price of house	1	2	3	4	5	6
c. Getting married	1	2	3	4	5	6
d. Investment decision	1	2	3	4	5	6
e. Quality of life	1	2	3	4	5	6
f. Job required	1	2	3	4	5	6
g. Location/ convenience	1	2	3	4	5	6
h. Necessary to raise children	1	2	3	4	5	6
i. Prospect of increasing housing price	1	2	3	4	5	6
j. Other(s) please specify_____	1	2	3	4	5	6

2-12. How important are the following factors in selecting your finance source(s)? Please CIRCLE (1-6) the degree of importance for each of the factors (where 1 indicates very important and 5 indicates not important at all, 6 indicates that you don't know).

	Very Important		Neutral		Not at all Important	Don't Know
a. Cost of loan	1	2	3	4	5	6
b. Relative ease of obtaining loan	1	2	3	4	5	6
c. Have other loans with other commercial bank	1	2	3	4	5	6
d. More flexibility in the loan terms	1	2	3	4	5	6
e. Recommended by friends/relatives	1	2	3	4	5	6
f. Other(s) please specify _____	1	2	3	4	5	6

2-13. If you financed your housing loan with a bank, what type of housing loan did you apply for?

☐ a. Fixed interest rate loan

☐ b. Floating interest rate loan

☐ c. A mix of fixed and floating interest loans

2-14. Do you have a savings account with your lending bank?

☐ a. Yes

☐ b. No

2-15. What is the duration of your housing loan?

☐ a. 10 years or less

☐ b. 11 – 20 years

☐ c. 21 – 30 years

☐ d. Above 30 years

2-16. How much was the house down payment (as a percentage of the price) for the home?

☐ a. 0%

☐ b. 0% – 20%

☐ c. 21% – 40%

☐ d. over 41%

2-17. What is the mode of your home loan repayment?

☐ a. Weekly

☐ b. Fortnightly

☐ c. Monthly

☐ d. Other(s) please specify_____

2-17-1. If weekly, what is the weekly repayment for your housing loan?

☐ i. NZ$ 500 or less

☐ ii. NZ$ 501– 750

☐ iii. NZ$ 751– 1000

☐ iv. NZ$ 1001– 1250

☐ v. NZ$ 1251 or above

2-17-2. If fortnightly, what is the fortnightly repayment for your housing loan?

☐ i. NZ$ 1000 or less

☐ ii. NZ$ 1001– 1500

☐ iii. NZ$ 1501– 2000

☐ iv. NZ$ 2001– 2500

☐ v. NZ$ 2501 or above

2-17-3. If monthly, what is the monthly repayment for your housing loan?

☐ i. NZ$ 2000 or less

☐ ii. NZ$ 2001– 3000

☐ iii. NZ$ 3001– 4000

☐ iv. NZ$ 4001– 5000

☐ v. NZ$ 5001 or above

2-17-4. If your mode of home loan repayment is other(s), please specify the approximate amount of your payment_____

2-18. Are there any additional charges for your home loan?

☐ a. Yes

☐ b. No

2-19. If yes, what were these additional charges? (You can tick more than one)

☐ a. Administrative or service fee

☐ b. Insurance fee

☐ c. Guarantee fee

☐ d. Other(s) please specify _____

2-20. Did your loan require collateral or security?

☐ a. Yes

☐ b. No

2-21. If yes, what kind of collateral or security is/are required? (You can tick more than one)

☐ a. Mortgage property

☐ b. Chattel mortgage (example motor vehicles)

☐ c. Savings/deposits

☐ d. Promissory notes (cashier check)

☐ e. Co-signor/co-guarantor (guarantee by other people)

☐ f. Other(s) please specify _____

2-22. What is the status of your loan?

☐ a. Fully paid (no longer have a loan)

☐ b. Current

☐ c. Past due

☐ d. Restructured

2-23. How easy was it to apply for the housing loan?

☐ a. Very easy

☐ b. Fairly easy

☐ c. Not very easy

☐ d. Not at all easy

2-24. Do you have other type(s) of financing other than your housing loan?

☐ a. Yes

☐ b. No (Please go to **Question 2-26**)

2-25. If you have other type(s) of financing, what are they? (You can tick more than one)

☐ a. Vehicle (car) loan

☐ b. Second housing loan

☐ c. Education loan

☐ d. Leasing financing

☐ e. Other(s) please specify_____

2-26. Do you still own the home post-earthquake?

☐ a. Yes

☐ b. No (Please go to **Question 2-26**)

2-27. Did you buy another house post-earthquake while keeping the old house?

☐ a. Yes (Please go to **Section 4**)

☐ b. No (Please go to **Section 6**)

2-28. If NO, did you buy a new home either outright or have a mortgage post-earthquake?

☐ a. Yes (Please go to **Section 4**)

☐ b. No (Please go to **Section 5**)

Section 3: Non-Homeowners Information Pre-Earthquake

3-1. What would best describe your housing arrangements pre-earthquake?

☐ a. Live with parents /relatives

☐ b. Rent

☐ c. Provided by government

☐ d. Other(s) please specify _____

3-2. Where was your house located pre-earthquake?

☐ a. East Christchurch

☐ b. South Christchurch

☐ c. West Christchurch

☐ d. North Christchurch

☐ e. Central Christchurch

3-3. In which of the following zone was your home located pre-earthquake?

☐ a. School zone

☐ b. Commercial zone (near to mall)

☐ c. Industrial zone (near to factory)

☐ d. Rural area

☐ e. Urban area

☐ f. I don't know

☐ g. Other(s) please specify_____

3-4. Have you applied for a housing loan before?

☐ a. Yes

☐ b. No (Please go to **Question 3-8**)

3-5. If yes, were you successful in getting the housing loan?

☐ a. Yes (Please go to **Question 3-7**)

☐ b. No

3-6. If NO, what are the major reasons that you were unsuccessful in getting the housing loan?

☐ a. I have owned one house

☐ b. Cannot meet the down payment

☐ c. Poor credit background

☐ d. Other(s) please specify _____

3-7. What was the source of your housing loan finance?

☐ a. Cash from friends/relatives

☐ b. Borrowed from commercial banks

☐ c. Borrowed from finance companies

☐ d. Other(s) please specify _____

3-8. How important are the following factors in determining your decision not to own a house? Please circle (1-6) the degree of importance for each of the factors. (Where 1 indicates very important and 5 indicates not important at all, 6 indicates that you don't

		Very Important		Neutral		Not at all Important	Don't Know
a.	Don't want to buy a home	1	2	3	4	5	6
b.	High housing price	1	2	3	4	5	6
c.	High down payment requirement	1	2	3	4	5	6
d.	Lack of housing choice available where I want to live (e.g., no apartment; no home unit; etc.)	1	2	3	4	5	6
e.	Housing in my price range is not available where I want to live	1	2	3	4	5	6
f.	Can't qualify for a loan	1	2	3	4	5	6
g.	Cheaper to rent	1	2	3	4	5	6
h.	Have other loan commitments(e.g. vehicle/education loans)	1	2	3	4	5	6
i.	Duration of living in Christchurch	1	2	3	4	5	6
j.	Other(s) please specify_____	1	2	3	4	5	6

3-9. Do you own a home either outright or have a mortgage post-earthquake?

☐ a. Yes (Please go to **Section 4**)

☐ b. No (Please go to **Section 5**)

c.

Section 4: Homeowners' Information Post-Earthquake

4-1. Is this first time for you to finance your homeownership?

☐ a. Yes

☐ b. No

4-2. How did you finance your home loan? (You can tick more than one)

☐ a. Cash from friends/relatives

☐ b. From savings

☐ c. Borrowed from commercial banks

☐ d. Other(s) please specify _____

4-3. What is the current market value of your home?

☐ a. Less than NZ$ 300,000

☐ b. NZ$ 300,000 – 490,000

☐ c. NZ$ 500,000 – 690,000

☐ d. NZ$ 700,000 – 890,000

☐ e. NZ$ 900,000 or above

4-4. What is the main reason for you to purchase a house post-earthquake?

☐ a. New migrant to Christchurch

☐ b. Lost house in earthquake

☐ c. Investment

☐ d. Response to the increasing housing price

☐ e. Necessary for living as life plan

☐ f. Other(s) please specify_____

4-5. How important are the following factors in determining your decision to purchase your home? Please CIRCLE (1-6) the degree of importance for each of the factors (where 1 indicates very important and 5 indicates not important at all, 6 indicates that you don't know).

		Very Important		Neutral		Not at all Important	Don't Know
a.	Availability of finance	1	2	3	4	5	6
b.	Price of house	1	2	3	4	5	6
c.	Getting Married	1	2	3	4	5	6
d.	Investment decision	1	2	3	4	5	6
e.	Quality of life	1	2	3	4	5	6
f.	Job required	1	2	3	4	5	6
g.	Location/ Convenience	1	2	3	4	5	6
h.	Necessary to raise children	1	2	3	4	5	6
i.	Rebuilding house after earthquake	1	2	3	4	5	6
j.	Prospect of increasing housing price (Affordable capital)	1	2	3	4	5	6
k.	Other(s) please specify_____	1	2	3	4	5	6

4-6. How important are the following factors in selecting your source of finance? Please CIRCLE (1-5) the degree of importance for each of the factors (where 1 indicates very important and 5 indicates not important at all, 6 indicates that you don't know).

		Very Important		Neutral		Not at all Important	Don't Know
a.	Cost of loan	1	2	3	4	5	6
b.	Relative ease of obtaining loan	1	2	3	4	5	6
c.	Have other loans with other commercial bank	1	2	3	4	5	6
d.	More flexibility in the loan terms	1	2	3	4	5	6
e.	Recommended by friends/relatives	1	2	3	4	5	6
f.	Other(s) please specify _____	1	2	3	4	5	6

4-7. If you financed your housing loan from a bank, what type of housing loans did you apply for?

☐ a. Fixed interest rate loan

☐ b. Floating interest rate loan

☐ c. A mix of fixed and floating interest loans

4-8. Do you have a savings account with your lending bank?

☐ a. Yes

☐ b. No

4-9. What is the duration of your housing loan?

☐ a. 1– 4 years

☐ b. 4 – 10 years

☐ c. 11 – 20 years

☐ d. 21 – 30 years

☐ e. Above 30 years

4-10. How much was the down payment for your new home?

☐ a. 20% – 30%

☐ b. 31% – 40%

☐ c. 41% – 50%

☐ d. over 50%

4-11. What is the mode of your home loan repayment?

☐ a. Weekly

☐ b. Fortnightly

☐ c. Monthly

☐ d. Other(s) please specify_____

4-11-1. If weekly, what is the weekly repayment for your housing loan?

☐ i. NZ$ 500 or less

☐ ii. NZ$ 501– 750

☐ iii. NZ$ 751– 1000

☐ iv. NZ$ 1001– 1250

☐ v. NZ$ 1251 or above

4-11-2. If fortnightly, what is fortnightly repayment for your housing loan?

☐ i. NZ$ 1000 or less

☐ ii. NZ$ 1001– 1500

☐ iii. NZ$ 1501– 2000

☐ iv. NZ$ 2001– 2500

☐ v. NZ$ 2501 or above

4-11-3. If monthly, what is the monthly repayment for your housing loan?

☐ i. NZ$ 2000 or less

☐ ii. NZ$ 2001– 3000

☐ iii. NZ$ 3001– 4000

☐ iv. NZ$ 4001– 5000

☐ v. NZ$ 5001 or above

4-11-4. If your mode of home loan repayment is other(s), please specify the approximately amount of your payment_____

4-12. Are there any additional charges for your home loan?

☐ a. Yes

☐ b. No (Please go to **Question 4-14**)

4-13. If YES, what are these additional charges?

☐ a. Administrative or service fee

☐ b. Insurance fee

☐ c. Guarantee fee

☐ d. Other(s) please specify_____

4-14. Did the earthquake impact your ability to get insurance?

☐ a. Yes

☐ b. No

4-15. Did your loan require collateral or security?

☐ a. Yes

☐ b. No (Please go to **Question 4-17**)

4-16. If yes, what kind of collateral or security was/were required?

☐ a. Mortgage property

☐ b. Chattel mortgage (example vehicles)

☐ c. Savings/deposits

☐ d. Promissory notes

☐ e. Co-signor/co-guarantor

☐ f. Other(s) please specify _____

4-17. What is the status of your loan?

☐ a. Fully paid

☐ b. Current

☐ c. Past due

☐ d. Restructured

4-18. How easy was it to apply for the housing loan?

☐ a. Very easy

☐ b. Fairly easy

☐ c. Not very easy

☐ d. Not at all easy

4-19. Do you have any other type(s) of financing other than your housing loan?

☐ a. Yes

☐ b. No(Please go to **Section 6**)

4-20. If you do have other type(s) of financing, what are they? (You can tick more than one)

☐ a. Vehicle (car) loan

☐ b. Another housing loan

☐ c. Education loan

☐ d. Leasing financing

☐ e. Other(s) please specify_____

After answering all the questions in section 4, please go to **section 6**.

Section 5: Non-Homeowners' Information Post-earthquake

5-1. What would best describe your current housing arrangements?

☐ a. Live with parents /relatives

☐ b. Rent

☐ c. Provided by government

☐ d. Other(s) please specify_____

5-2. Have you ever applied for a housing loan?

☐ a. No, never (please go to **Question 5-3** and **Question 5-6**)

☐ b. Yes, but was rejected (please go to **Question 5-4**)

5-3. If NO, what was the major reason for not applying for a house loan? (You can tick more than one)

☐ a. Fear of inability to repay the loan (e.g., insufficient income)

☐ b. High interest and fees (e.g., service fee, insurance fee, etc)

☐ c. Difficult and lengthy procedures

☐ d. Availability of other financing sources

☐ e. Lack of bank relationship

☐ f. Lack of collateral/security

☐ g. Bad credit history

☐ h. Did not need a loan

☐ i. Other(s) please specify _____

5-4. If YES, what type of home financing did you apply for? (You can tick more than one)

☐ a. Mortgage loans from commercial banks

☐ b. Mortgage loans from informal lenders

☐ c. Mortgage loans from other mortgage agencies

☐ d. Other(s) please specify _____

5-5. What was the major reason for rejection of your housing loan? (You can tick more than one)

☐ a. Insufficient income/assets

☐ b. Lack of a secure job (e.g., regular employee)

☐ c. Lack of collateral/security

☐ d. Bad credit history

☐ e. Other(s) please specify _____

5-6. What is the reason you do not own a house at present?

☐ a. New migrators after earthquake

☐ b. Houses damaged in earthquake

☐ c. A temporary stay in Christchurch

☐ d. Other(s) please specify _____

5-7. How important are the following factors in determining your decision to buy a house? Please CIRCLE (1-6) the degree of importance for each of the factors, (where 1 indicates very important and 5 indicates not important at all, 6 indicates that you don't

		Very Important		Neutral		Not at all Important	Don't Know
a.	High housing price	1	2	3	4	5	6
b.	High down payment requirement	1	2	3	4	5	6
c.	Lack of housing choice available where I want to live	1	2	3	4	5	6
d.	Financial constraints	1	2	3	4	5	6
e.	Housing in my price range is not available where I want to live	1	2	3	4	5	6
f.	Do not qualify for a loan	1	2	3	4	5	6
g.	Cheaper to rent	1	2	3	4	5	6
h.	Have other loan commitments(e.g. vehicle/education loans)	1	2	3	4	5	6
i.	Duration of living in Christchurch	1	2	3	4	5	6
j.	Afraid of future earthquake	1	2	3	4	5	6
k.	Difficulty to get insurance post-earthquake	1	2	3	4	5	6
l.	Other(s) please specify_____	1	2	3	4	5	6

5-8. Do you have an intention to purchase a house in the near future (in less than 2 years)?

☐ a. YES

☐ b. NO (Please go to **Section 6)**

5-9. If YES, how are you going to finance your house purchase? (You can tick more than one)

☐ a. Personal funds

☐ b. Bank loans

☐ c. Informal loans

☐ d. Other(s) please specify _____

5-10. If you are going to purchase a house, what type of housing will you be interested in?

☐ a. A free standing house

☐ b. An apartment

☐ c. A home unit

☐ d. Other(s) please specify _____

Section 6: Both Homeowners' and Non-homeowners' Information(for all respondents)

6-1. What is your gender?

☐ a. Male

☐ b. Female

6-2. Which age group do you belong to?

☐ a. 25 and below

☐ b. 25 – 34

☐ c. 35 – 44

☐ d. 45 – 54

☐ e. 55 – 64

☐ f. 65 and over

6-3. What is your marital status?

☐ a. Single/never married

☐ b. Married

☐ c. Divorced/separated

☐ d. De facto relationship

☐ e. Widowed

6-4. What is the status of your residency in New Zealand?

☐ a. Citizen/Permanent Resident (Please go to **Question 6-6**)

☐ b. Other visa holder

6-5. Do you think the visa you hold (non-citizens/residents) impacts your ability to get a mortgage?

☐ a. Yes

☐ b. No

6-6. Which is the highest level of education you have completed?

☐ a. Primary school or lower

☐ b. High school

☐ c. Undergraduate degree (Bachelor or diploma)

☐ d. Postgraduate degree (Postgraduate Diploma/ Masters/PHD)

☐ e. Other(s) please specify_____

6-7. What is your occupation?

☐ a. Manager

☐ b. Professional

☐ c. Technician or Trades Worker

☐ d. Community or Personal Service Worker

☐ e. Clerical and Administrative Worker

☐ f. Sales Worker

☐ g. Machinery Operator or Driver

☐ h. Labourer

☐ i. Student

☐ a. Unemployed

☐ b. Retired

☐ c. Other(s) please specify_____

6-8. What is your household annual income?

☐ a. Up to NZ$ 20,000

☐ b. NZ$ 20,001-35,000

☐ c. NZ$ 35,001-50,000

☐ d. NZ$ 50,001-65,000

☐ e. NZ$ 65,001-80,000

☐ f. NZ$ 80,001-95,000

☐ g. Above NZ$ 95,000

6-9. How long have you been working?

☐ a. less than a year

☐ b. 1 year – 5 years

☐ c. 6 years – 11 years

☐ d. 12 years and above

6-10. Which of the following best describes your household?

☐ a. Adult living alone

☐ b. Single parent with child(ren)

☐ c. Couple, no child(ren)

☐ d. Couple, with child(ren)

☐ e. Immediate and extended family members

☐ f. Other(s) please specify_____

6-11. How many persons live in your household (including yourself)?

☐ a. One people

☐ b. Two people

☐ c. Three people

☐ d. Four people and above

6-12. How many dependents (non-working people such as children and the elderly) are there in your household?

☐ a. None

☐ b. 1 – 2

☐ c. 3 – 4

☐ d. 5 and above

Your participation in this survey is greatly appreciated. Thank you for your time and if you have further comments about homeownership and home loans, please feel free to comment in the space provided below. Please post the questionnaire back in the envelope provided before 25th, October, 2015. Once again, we assure you that your identity will remain STRICTLY CONFIDENTIAL.